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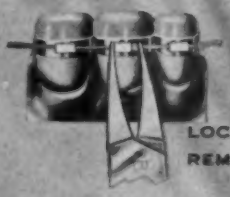

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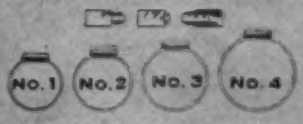

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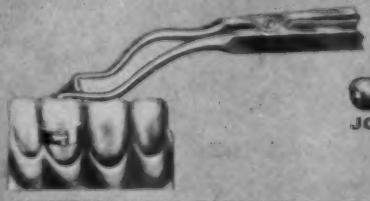

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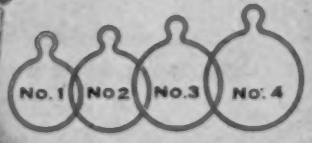

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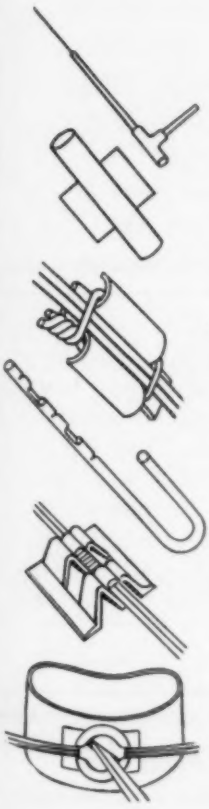

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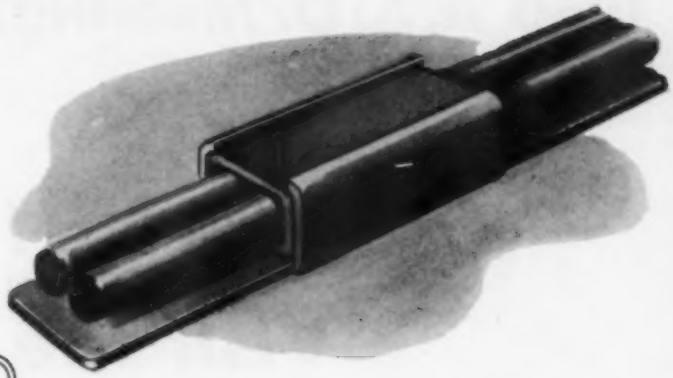
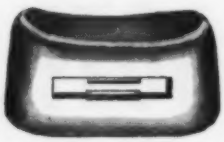
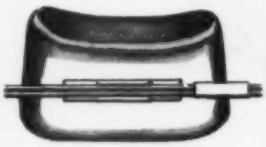




Outer open sleeve, mounted on band. Note reduced bulk.



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VOL. 36 APRIL, 1950 NO. 4

Original Articles

THE USE OF THE TWIN-WIRE MECHANISM IN TREATING CLASS II, DIVISION 2 CASES OF MALOCCLUSION

JOSEPH E. JOHNSON, D.D.S., LOUISVILLE, KY.

IN LOOKING through the literature on orthodontics we find that very little has been written on the treatment of cases in Class II, Division 2 malocclusion. In fact, only two papers on this type of malocclusion have been published in our AMERICAN JOURNAL OF ORTHODONTICS during the past twenty years. Since I have written articles on the use of the twin-wire mechanism in the treatment of all other types of malocclusion, I concluded that now would be the proper time to describe my method of treating this type of case.

In examining the last 500 cases which had been treated in my office, I found 34 bilateral and 19 unilateral cases in Class II, Division 2, making a total of 53 of this type, or slightly more than 10 per cent. All but 4 of these had deep overbites and only 2 had marked facial deformities, and of these 6 cases 2 had a very decided lack of development in the symphysis. However, practically all had a lack of facial height in the lower third of the face, which would indicate a lack of vertical growth in the molar and premolar regions.

In Class II, Division 2 malocclusion the anterior maxillary teeth are inclined lingually rather than labially; this is especially true of the central incisors. Usually, the axial inclination of the mandibular incisors is to the lingual. There is also a tendency for the incisors, both mandibular and maxillary, to be somewhat extruded. The great majority of these cases need slight expansion in both arches. So, in the treatment of this type, it is necessary to expand both arches from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch, it is also necessary to depress the incisors in both arches and to develop vertical growth in the molar and premolar regions, as well as to correct the mesiodistal occlusion. The twin-wire arch and its auxiliary appliances practically correct this condition automatically.

Read before the Central Section of the American Association of Orthodontists, Lincoln, Neb., Oct. 26, 1948; also read before the American Association of Orthodontists, New York, N. Y., May, 1949.

CASE REPORTS

CASE 1.—The patient was a girl 12 years of age (Fig. 1). Hers was a typical Class II, Division 2 case. The maxillary central incisors had an axial inclination of minus 20°. The mandibular central incisors had an axial inclination of plus 9°. Also, both arches had a decidedly crowded condition with a deep overbite, which is usually associated with this type of case.

Bands were placed on the four first molars and tubular lingual appliances were constructed for each arch. The buccal tubes on the maxillary arch were soldered so that the twin arch was lying well to the gingival surface (Fig. 2, *A*). Four bands were placed on the maxillary anterior teeth.

Please observe that the caps on the central incisors were placed to the distal, which made the rotation of these teeth easier. The lateral bands were seated so that, when the teeth were lined up, the locks would all lie on the same plane, as in Fig. 2, *B*.

An 0.010 twin arch without hooks was placed on the maxillary arch. On the left side the end tube was very short, which permitted a gradual pressure of the twin arch on the left lateral incisor. The right end tube was longer because the right lateral incisor was much farther erupted than the left. However, it probably would have been better if this end tube had been short like the one on the opposite side.

The twin arch was seated on the two lateral incisors. Then it was crimped with an amalgam instrument. I was not able to seat it in the attachments on the central incisors without undue pressure; therefore, caps were seated and an 0.007 ligature wire was passed through them and ligated to the twin arch.

In using ligatures one must be very careful not to exert too much pressure, because it is very easy to twist the ligature and thereby exert more pressure than one realizes. So, after the ligatures have been tightened and bent down so as not to irritate the lip, the amalgam instrument is again used to crimp the twin wires to make the arch lie as passively as possible.

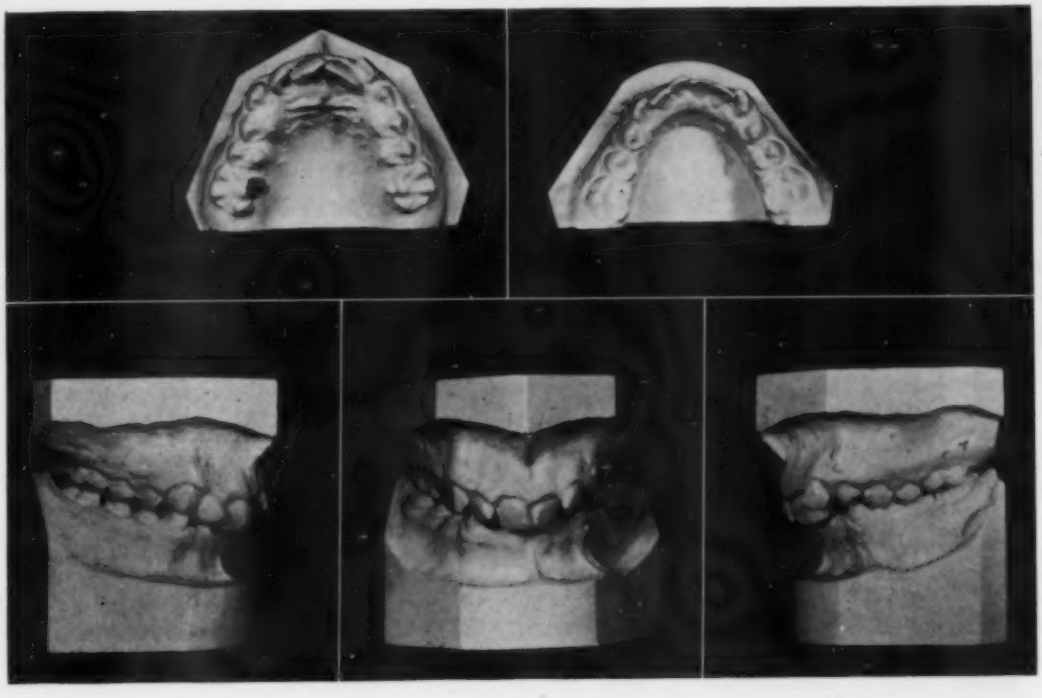
The lower anterior teeth were not banded because when I began the treatment of this patient I had not yet discovered how easy it is to make lower anterior bands. In other words, I had not found that these bands could be pinched on the labial, then soldered and reversed.

When the patient returned at the end of two weeks, the twin arch was removed, a new one with hooks was seated in its place, and she was instructed to wear elastics. I used a light elastic at the beginning of this treatment—one that would not exert more than two ounces of pressure.

From then on, the twin arch was changed once every month, and with less crimping in each successive arch, until gradually the teeth had been lined up three and one-half months later as shown in Fig. 2, *B*.

You will notice that the force of the elastics caused the cuspids to be depressed on both sides. Accordingly, at this time coil springs were placed on the end tubes, as shown in Fig. 2, *C*.

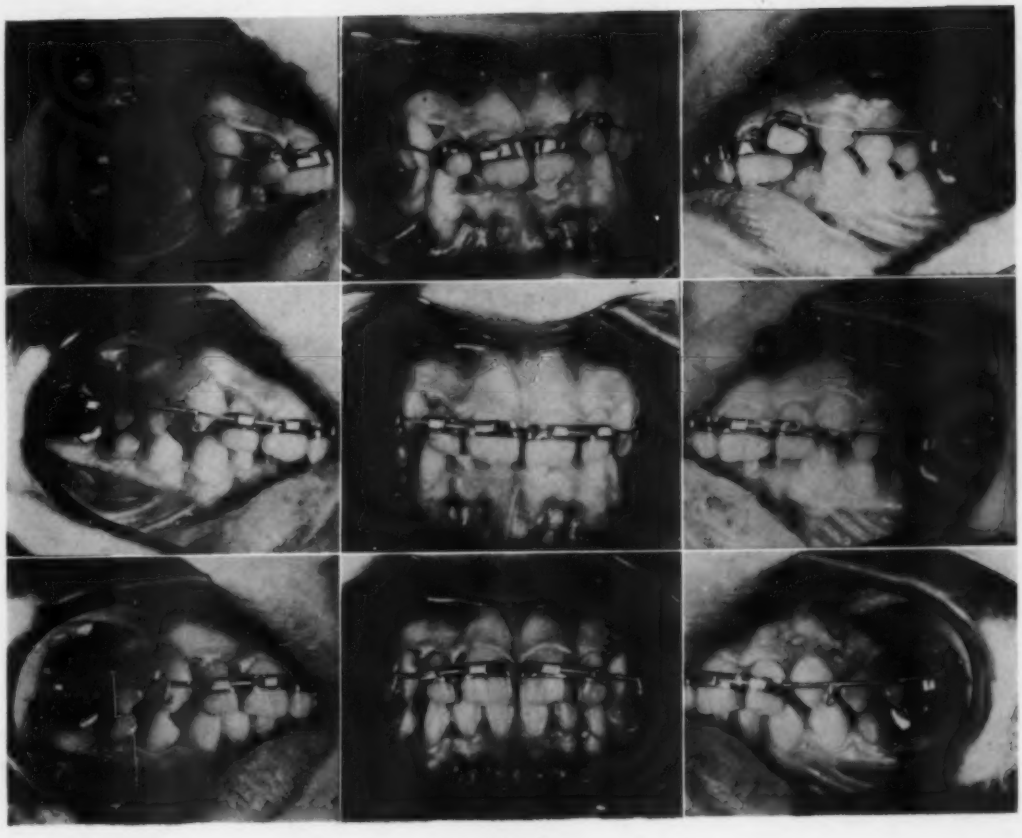
These coil springs were used to move the molars distally. However, before pressure was exerted on the molars, the lingual arch was removed because it



A.

B.

Fig. 1.



A.

B.

C.

Fig. 2.

was found that the molars do not move back readily with the lingual arch in position. Furthermore, it is usually necessary to move one molar farther distally than the other; this, of course, cannot be accomplished with the lingual appliances in position.

In Class II, Division 2 malocclusion, the coil springs are placed much earlier than they are in Class II, Division 1 because usually in Class II, Division 2, the lingual surfaces of the maxillary anterior teeth are already in contact with the labial surfaces of the mandibular incisors.

Great care should be exercised in compressing the coil springs so as not to exert too much pressure on the molars, for if too much pressure is applied against them, two things are likely to happen: (1) the molar, if moved back too rapidly, will tip; (2) the anterior maxillary teeth are likely to be moved forward, even if the child wears the elastics constantly; therefore, two ounces of pressure are exerted with the coil springs and an elastic is used that has about four or five ounces of pull.

Coil springs, 0.009 inch thick and $\frac{1}{4}$ of an inch in length, are used and should never be compressed more than $\frac{1}{32}$ of an inch. However, for beginners, I would advise a coil spring 0.007 inch thick and $\frac{3}{8}$ of an inch in length. The longer springs do not exert as much pressure as the shorter ones, if they are compressed the same amount.

I overwork the Class II, Division 2 cases about the same amount as the Class II, Division 1, as shown in Fig. 2, *C*. I think this overworking of the case is very important. First, it gives the premolars an opportunity to become well locked in the normal mesiodistal relation. Second, I am convinced that when moving the molars distally, we cause a downward development in that region; the continued pull of the elastics certainly produces a vertical development in the lower, which, I think, accounts for the greater part of opening the bite in this type of case, as shown in the central illustration of Fig. 2, *C*. While I am able to depress the anterior teeth with the twin-wire appliance, I am convinced that most of the opening of the bite is caused by development in the lower molar and premolar regions.

Please observe in the left illustration in Fig. 2, *C* that the lower right first premolar has been rotated. It was already slightly rotated at the beginning of treatment, as shown in the left illustration in Fig. 2, *A*. I should have placed a band on it with a spur and ligated it to the lingual arch at that time; I did it later, as shown in Fig. 3, *A*.

This crowding of the premolars could have been caused by the forward shift of the molar on that side or by the lingual movement of the anterior mandibular teeth.

I think it good practice to observe the position of the first premolars at the beginning of treatment, and to note if there is any tendency for the tooth to be rotated or if the tooth has a tendency to be crowded out of the arch. In either case it is advisable to band them at the beginning of treatment and ligate them to the lingual arch.

At the end of nine months the teeth were in a very nice occlusion, except for the overworked condition, as shown in Fig. 2, *C*. At this time the coil springs were removed and the molars and premolars were gradually allowed to drift back to normal, with the patient wearing light elastics at night. She was given a Hawley retaining plate in the maxillary arch a little less than a year after treatment was begun.

In the mandibular arch the tubular appliance was replaced by a soldered lingual arch and the right first premolar was ligated to it to complete the rotation of this tooth (Fig. 3, *A*). Please observe the nice overbite and occlusion at this stage of the treatment.

Fig. 3, *B* was taken five years after Fig. 3, *A*. No retention whatever had been worn during the last three years.

Fig. 3.

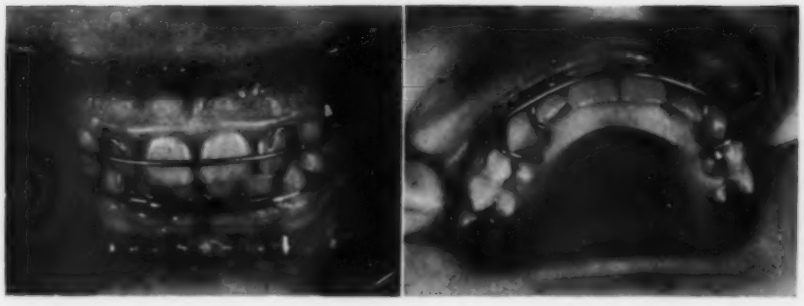


Fig. 4.

You will observe that there has been a slight rotation of the two maxillary lateral incisors. It is a condition which often occurs in this type of case. It does not seem to matter how accurately your labial bar on the Hawley plate

fits against these teeth because, in spite of this, the mesial corners of these lateral incisors tend to rotate. However, in my later cases I have overcome this tendency by embedding an 0.025 inch steel wire in the acrylic and bringing it between the cuspid and lateral incisor and shaping it to rest against the labiomesial corner as shown in Fig. 4. The palatal views of this case are shown in Fig. 5. Please observe how the buccal tubes have been soldered so that the end tubes lie away from the premolars and how the left cuspid is permitted to expand in this region.

Also, observe how the twin arch assumes the shape of a normal dental arch when it is placed in the buccal tubes. This is one of the many advantages of the twin arch, for, when it is removed from the vise in which it has been pulled, it need not be shaped in any way except to see that it lies in a horizontal plane. It can then be locked into position, changed every month to six weeks, and will automatically line the anterior teeth into a normal arch form.

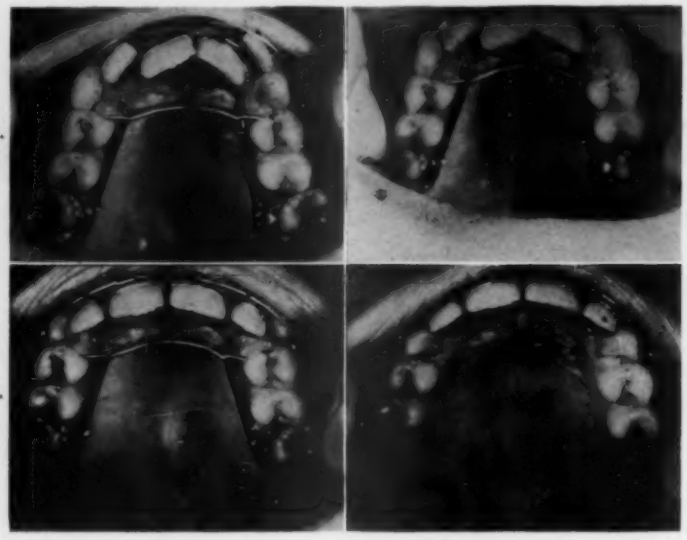


Fig. 5.

The left illustration in Fig. 5, *B* shows the expansion gained with a tubular lingual upper arch in four months. The expansion is placed in the arch when the molar bands are cemented, the finger springs having been ligated to the body wire with dental floss so as not to exert pressure on the premolars at the beginning of treatment. At the end of two weeks the dental floss is removed, and the patient will never complain of soreness in the premolars because these finger springs exert only one and one-half ounces of pressure. This gentle pressure moves the teeth out so gradually that there is no tipping of the premolars (Fig. 5, *B*, right illustration).

As previously stated, when I start to move the molars distally, I cut out the lingual appliance, and, since the buccal segment has been moved so gradually, there is no tendency for it to collapse during the subsequent treatment.

Fig. 6, *A* shows the patient at the beginning of treatment, and Fig. 6, *B*, six years later. As mentioned in the early part of the paper, very few of the patients have any marked facial deformity.

Fig. 6.

CASE 2.—The patient was a girl 15 years of age. She was very large for her age; in fact, she had the appearance of a girl of 18 or 19 years.

The alveolar process was heavy and both the maxillary and mandibular arches were well developed. She was under active treatment one year, ten months, and, although she was a good, obedient patient, the teeth moved slowly due to the heavy bone structure.

She had a typical Class II, Division 2 malocclusion with the first premolars in the maxillary arch biting buccally to the lower arch (Fig. 7, *A*). Tubular appliances were placed on both arches. Since a great deal of expansion was needed in the mandibular premolars after I had gained expansion in the cuspid region, this lower arch was removed and replaced by the staple appliance which is exceptionally efficient in expanding the premolar region.

Four bands were placed on the anterior maxillary teeth as is the custom in this type of case. I very seldom band the cuspids, unless they are rotated or tipped. The buccal tubes were soldered so that the arch was lying slightly to the gingival, as shown in Fig. 7, *A*. I did not think it necessary to have it lie too near the gingival, because she has a chip in both central incisors which eventually it will be necessary to grind off.

You will notice in Fig. 7, *B* that the midsection of the twin arch is short and that the end tube reaches to the mesial surface of the first premolar on both sides; also that there are no hooks as previously mentioned. In Fig. 7, *C*, notice that the midsection of the twin-wire arch has been shortened and that the hooks are well forward on the cuspids. This was done to get more traction from the elastics.

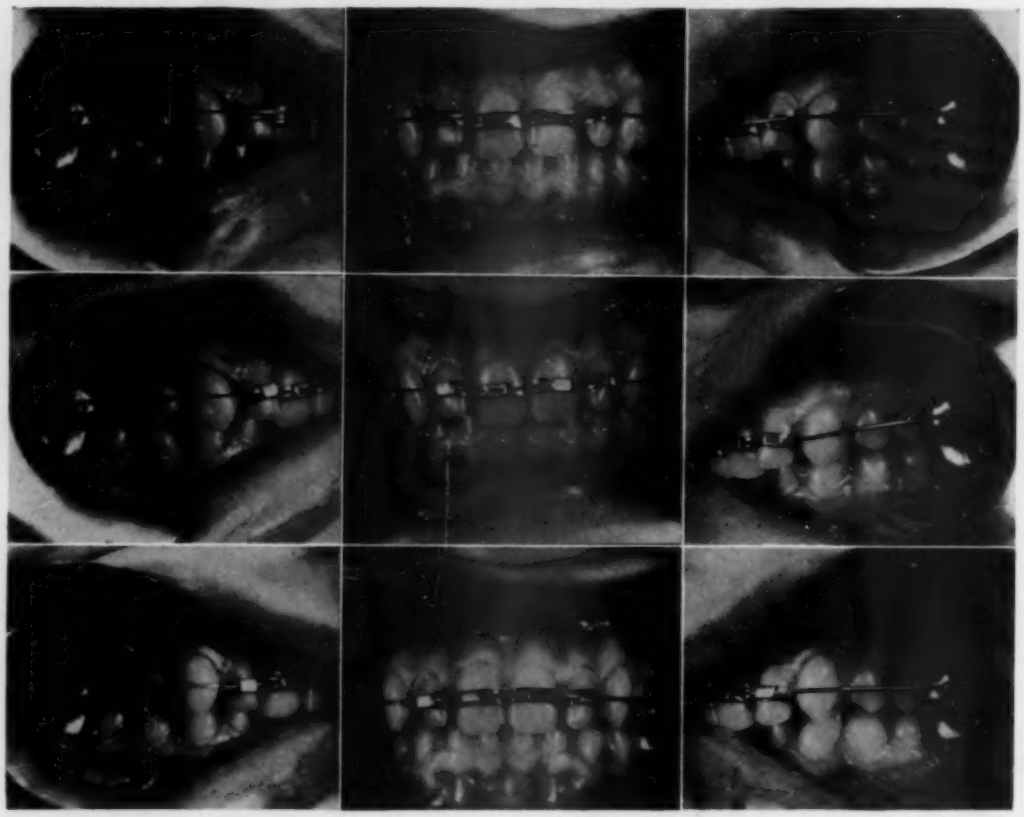


Fig. 7.

As shown in the front view of Fig. 7, *C*, we have expanded in the maxillary cuspid region and we have changed the axial relation of the four incisors. The central incisors have been brought to a positive axial inclination and the lateral incisors have been brought down and tipped into the same axial inclination as the central incisors. The appliance does this automatically. The anterior teeth have been moved back against the lower teeth, which has caused the two first maxillary premolars to be depressed (Fig. 8, *A*).

About one month after Fig. 8, *A* was taken, coil springs were placed over the end tubes, and the distal movement of the molars was begun. Fig. 8, *B* shows the results obtained during the next three months. Please observe that we were beginning to get a fairly normal mesiodistal relation of the molars. Also observe that the lower right second premolar was being expanded excessively, this being done by the staple arch which replaced the tubular arch after we had gained expansion in the cuspid region. This is one of the dangers that one must watch when using the staple arch. It expands so quickly that one may get overexpansion before one realizes it.

Fig. 8, *C* shows the patient ten months later than Fig. 8, *B*. In this instance, I have substituted an 0.010 by 0.020 inch flat arch for the twin arch.

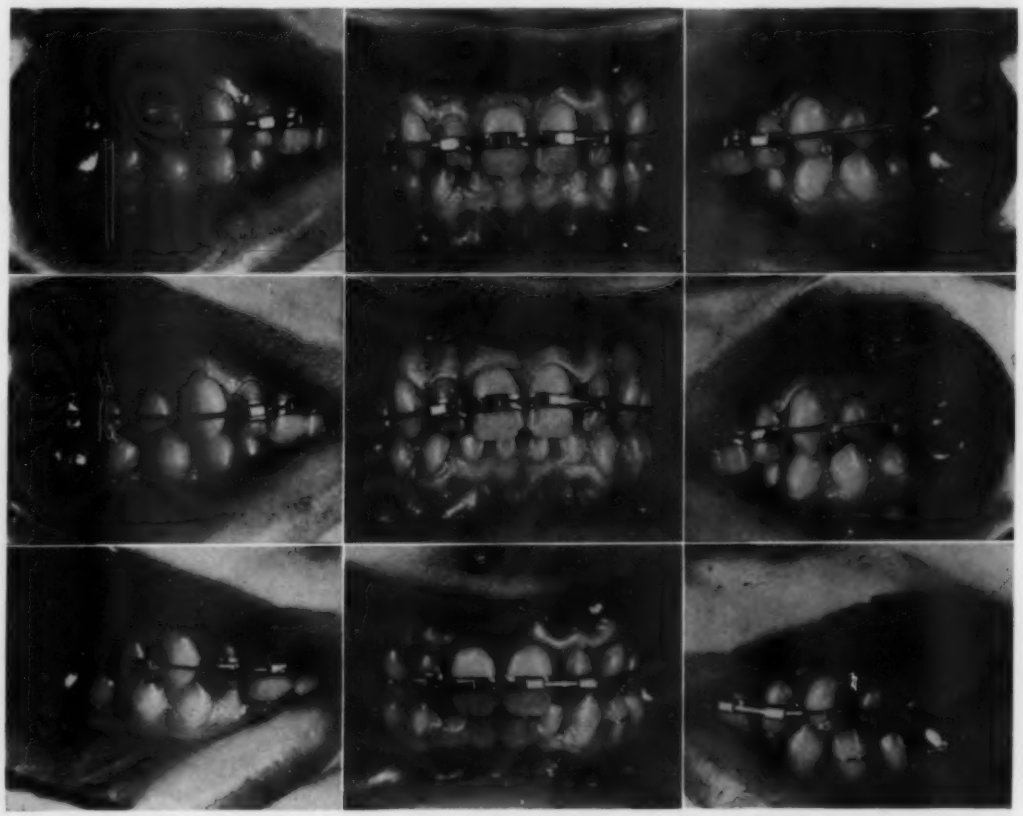


Fig. 8.

I frequently make this change when I need slightly more tipping of the axial inclination of the lateral incisors and also when I learn that the patient will be out of the office for a few months, because a flat arch usually does not break as easily as the twin-wires arch.

You will notice that we have nice mesiodistal relation of all the teeth. The mandibular right second premolar is still overexpanded but is gradually drifting back into occlusion.

Soon after these photographs were taken the entire upper appliance was removed, and the patient was given a Hawley retaining plate in the maxillary arch (Fig. 9, *A*). The lower appliance was removed and a soldered lingual retainer was made from molar to molar—it standing slightly away from the lingual surface of the premolars to permit them to settle back into normal occlusion, for they were still overexpanded on the right side.

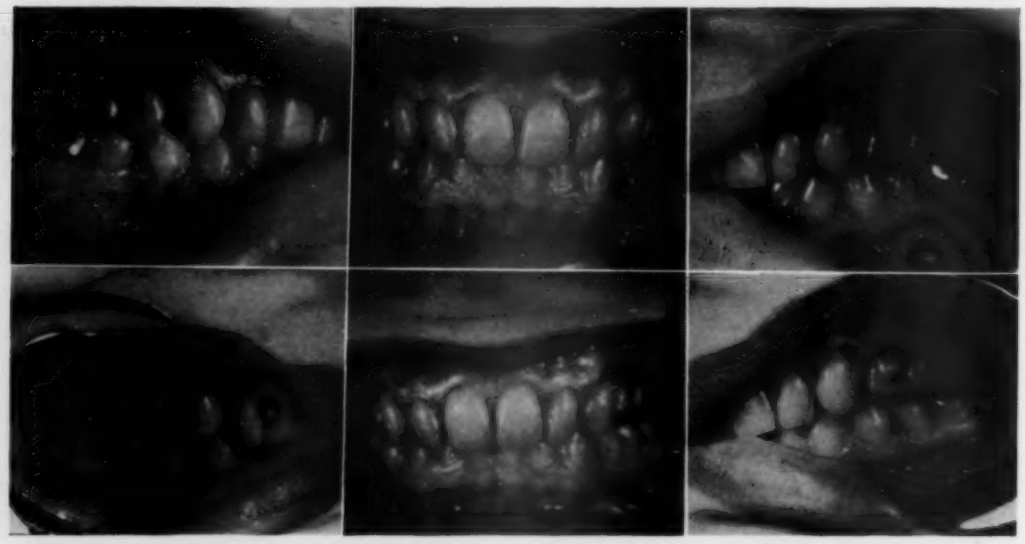


Fig. 9.

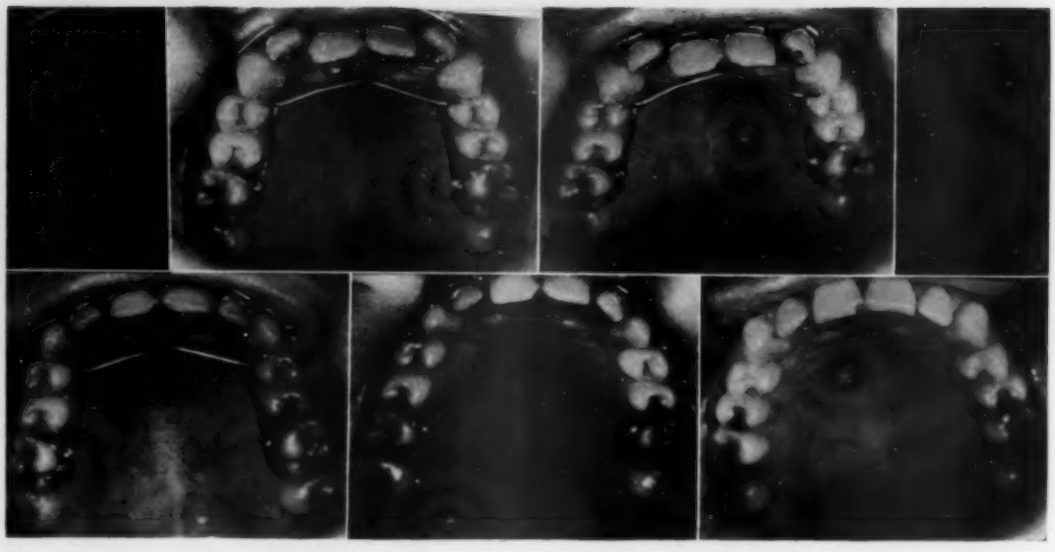


Fig. 10.

Fig. 9, *B* shows the patient one and one-half years later. Please notice the nice occlusion in both arches. The bite seems a little deep, but it must be borne in mind that at the time of writing I had not completed grinding the central incisors, which, when done, will make it approximately correct. Also, please notice that the second premolar is now in good occlusion.

In Fig. 10 are seen lingual views of the maxillary arch showing the tubular arch. Very little expansion was necessary. Fig. 11, *A* and *B* show facial views before and after treatment, respectively. Although there was some slight improvement in her appearance, this type of case usually has a normal appearance.

A. *B.*

Fig. 11.

CASE 3.—The patient was a boy, 12 years of age, with a bilateral distoclusion, complicated in the maxillary arch by the mesial drift of the right premolars and molars, which almost closed up the space for the right cuspid (Fig. 12).

In the mandibular arch the premolars and molars had also drifted forward, practically closing the space for the right lateral incisor which was in lingual occlusion. The case was further complicated by an extremely deep overbite and a marked irregularity of the maxillary incisors.

Bands were placed on the four first molars and the case was started with tubular lingual appliances on both arches; the first problem was to gain enough

space to line up the anterior incisors. Bands were placed on the four maxillary incisors (Fig. 13, *A*). Later in treatment bands were also placed on the four lower incisors.

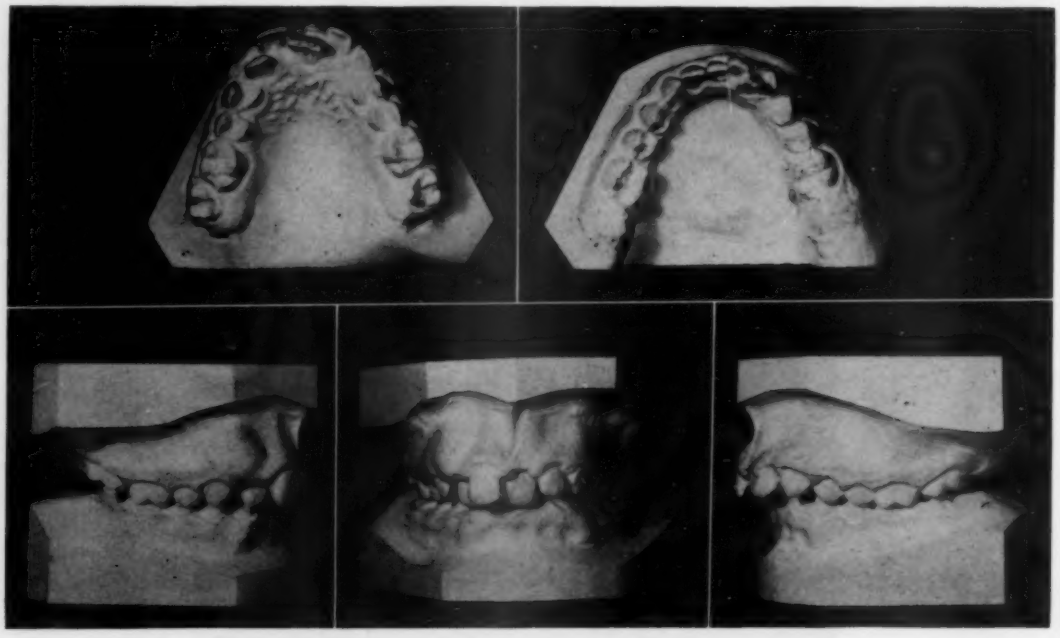


Fig. 12.

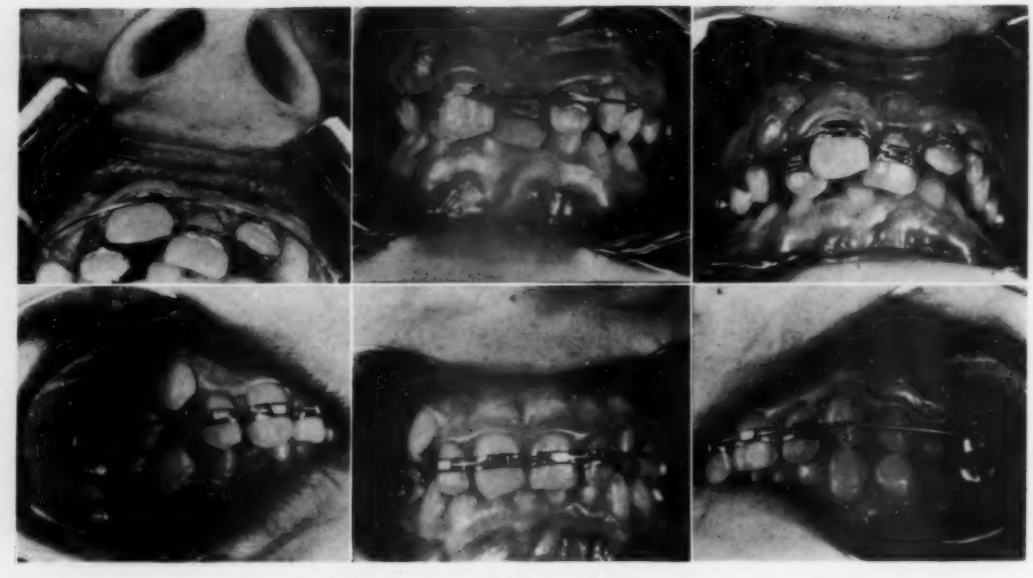


Fig. 13.

Fig. 13, *A* shows a front view of the case at the beginning of the treatment. Please observe that there are no hooks on the twin Wire Arch. This view also shows how much higher the band on the right central incisor was placed to elongate it.

Fig. 13, *A*, right illustration, shows the twin arch locked into position. The arch was crimped sufficiently to seat it in the attachment on the left central incisor. However, it was thought best to run an 0.007 inch ligature through the cap on the right central incisor later and ligate it to the twin arch, care being taken not to exert too much pressure with this ligature.

I would now solder the buccal tubes so that the twin arch would lie farther gingivally in the anterior section.

Fig. 13, *B* was made seven months later. You will notice that quite a bit of tooth movement took place during that time. The left central incisor was brought labially into alignment. Please observe how the crown was tipped into a normal axial relation. The twin arch does this automatically, without any effort on my part.

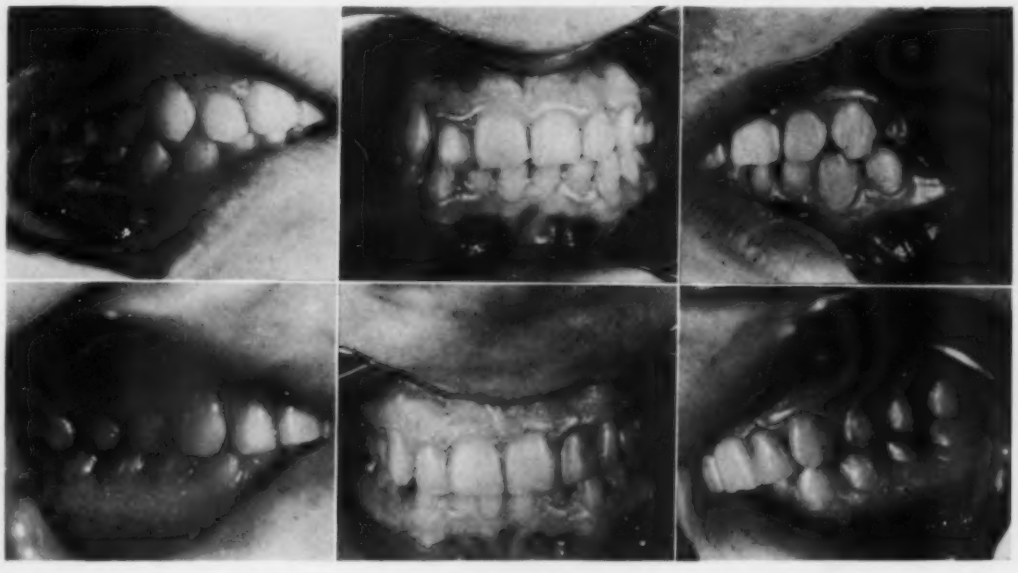


Fig. 14.

The right central incisor, due to the fractured incisal corner, was purposely elongated so that it could be ground off. This was done by placing the band higher on the right central incisor than on the left central and lateral incisors. The boy began to wear light elastics about one month after treatment was begun (Fig. 13, *B*).

The tubular appliance in the maxillary arch was removed; I moved the molar and premolar distally, not only to correct the distal occlusion but also to gain space for the right cuspid.

On the left side up to this time I had not started to use the coil springs, for I wanted the right side to catch up with it. It took me one and one-half years to get the boy's teeth into normal alignment. Fig. 14, *A* shows the case at this time. Please observe that the median line was corrected, the bite opened, and space gained for the maxillary right cuspid and the mandibular right lateral

incisor. The first premolar in the mandibular right arch was rotated, as in Case 1. However, I did not attempt to correct it but decided to give nature a chance, which I believe was justified six years later, as shown in Fig. 14, *B*.

The left illustration in Fig. 14, *A* shows the left side slightly overworked. For his retention he wore a Hawley retainer in the upper arch and a soldered lingual in the lower for two years.

Fig. 14, *B* shows the case six years later. His bite had settled slightly to what I suppose can be considered normal for him. Unfortunately, he was hit in the mouth with a baseball, which broke off the left lateral incisor, so he is now wearing a jacket crown. The side views show his teeth in good normal mesiodistal relation. The lower right premolar had rotated back into normal position, as had been hoped.

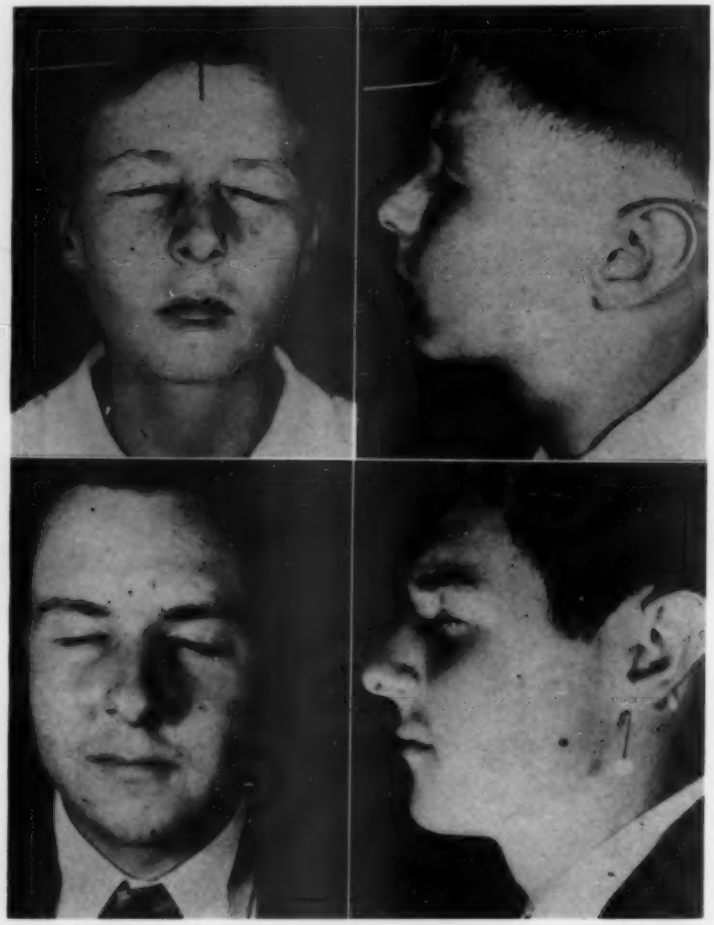
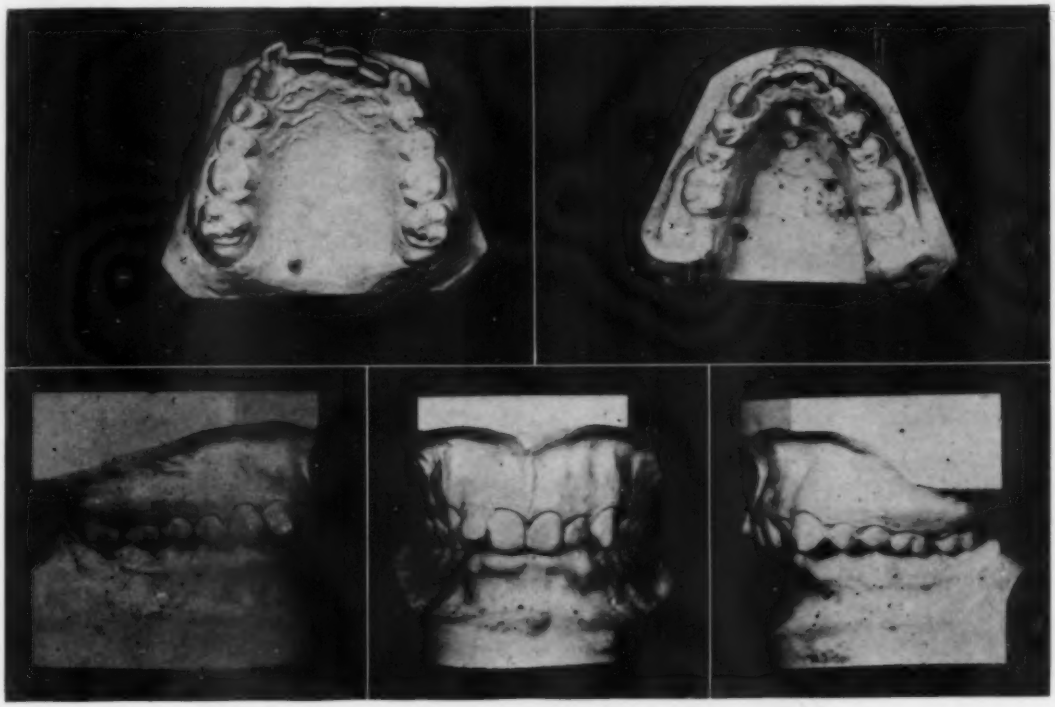


Fig. 15.

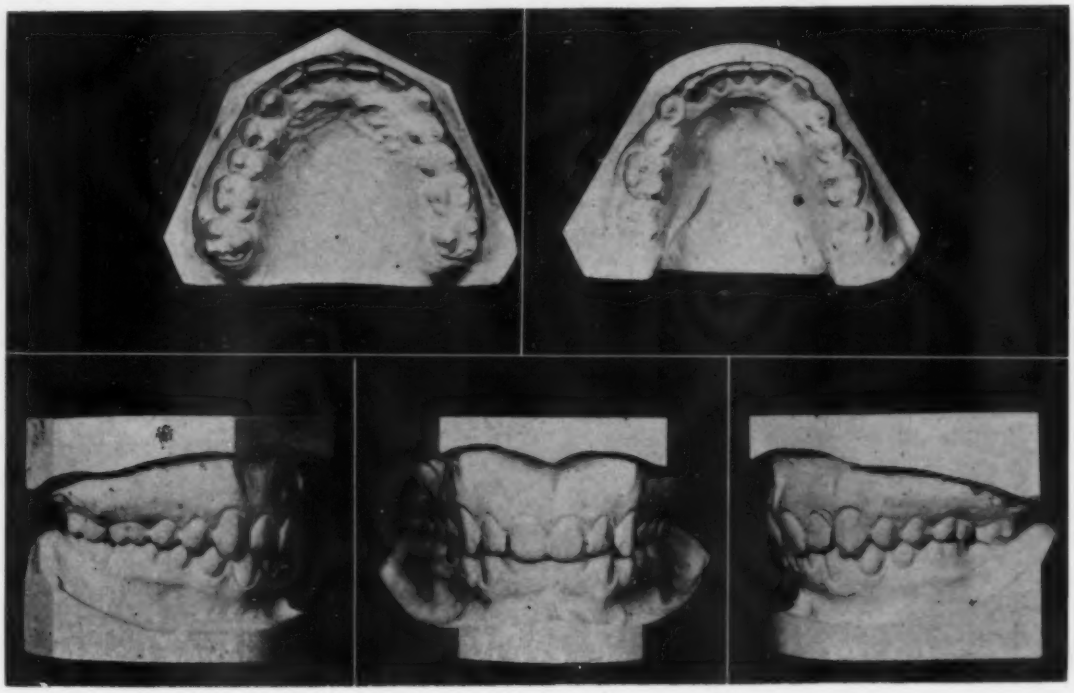
Fig. 15, *A* shows his photographs at the beginning of treatment and Fig. 15, *B*, eight years later. I believe this case is a good example of why we should stop, look, and listen before we rush in and do extraction. I believe it is evident in Fig. 15, *B* that if we had extracted we would have had a very decided lack



A.

B.

Fig. 16.



A.

B.

Fig. 17.

of development in the lower part of the face, and I do not think by the wildest stretch of the imagination one could say that I caused a bimaxillary protrusion in correcting this difficult case.

Fig. 18.

Fig. 19.

CASE 4.—The patient was a boy 15 years of age who had an extreme Class II Division 2 malocclusion (Fig. 16). The whole lower arch was very narrow. The maxillary teeth were biting completely buccally to the mandibular. This

is also associated with a deep overbite and decided lingual-axial inclination of the maxillary central incisors and the left lateral incisor. There was very little facial deformity, as shown in Fig. 19.

A tubular lingual appliance was placed on both arches and the four anterior maxillary teeth were also banded. After he had worn the tubular lingual appliance in the mandibular arch for about six months, sufficient width had been gained in the cuspid region, so it was then replaced with a staple arch to gain farther expansion in the premolar region.

The boy was a good patient. After sixteen months of treatment we had his teeth in good alignment, as shown in the models (Fig. 17), taken at the end of that period.

For retention he wore a Hawley plate in the maxillary arch and a soldered lingual appliance in the mandibular arch. About this time he moved away, and I did not see him again for two years. He told me that he had worn the plate for only about a year, and he also had a dentist remove the mandibular appliance at that time. The oral photographs were made of him two years later (Fig. 18). He had not worn appliances of any type for at least a year.

I am showing this case to prove that even in these extreme Class II, Division 2 cases it is unnecessary to extract to obtain good results. If you will observe his final photographs (Fig. 19, *B*), I think you will agree with me that we would not have obtained such nicely balanced features if we had resorted to extraction.

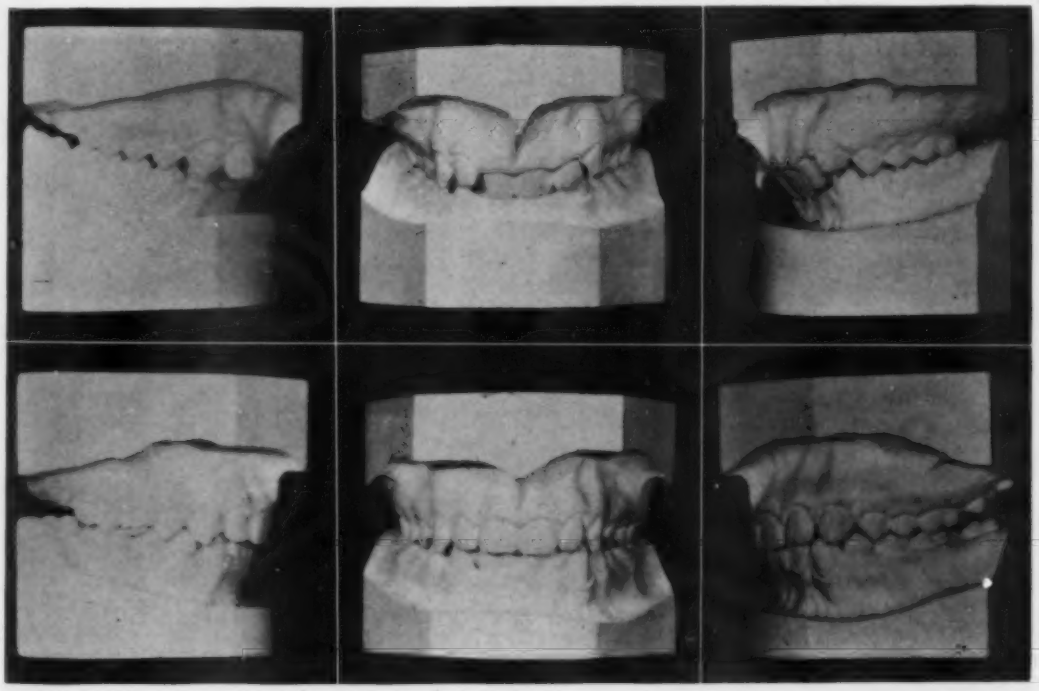


Fig. 20.

CASE 5.—The patient was a boy 12 years of age. The axial inclination of his maxillary central incisors was the most extreme of any case I have ever treated (Figs. 20, *A*, and 21). The protractor (Fig. 22, *A*), made to measure

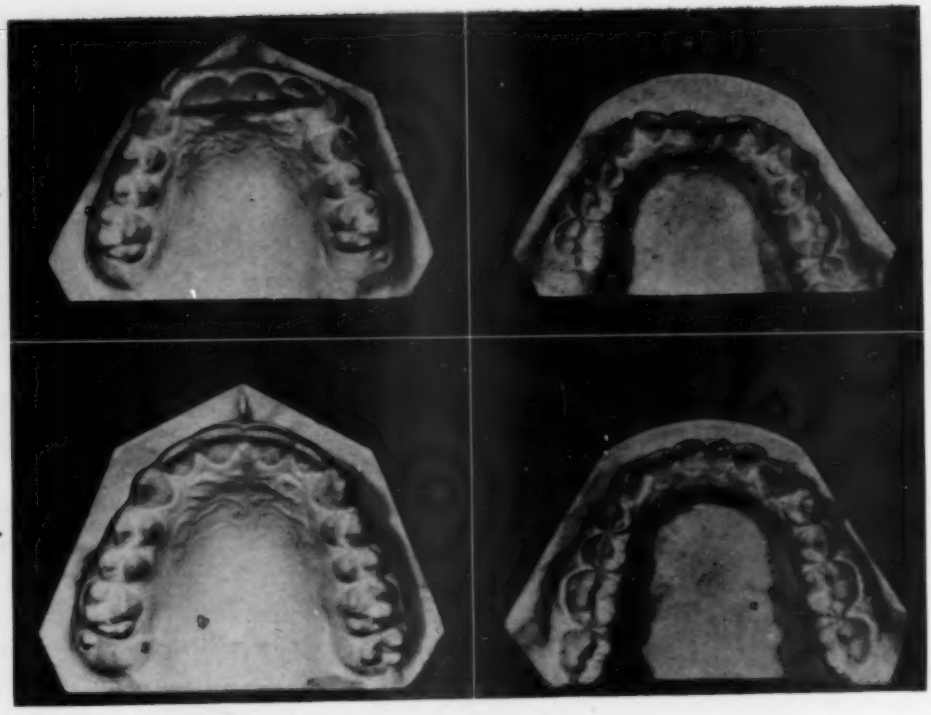


Fig. 21.

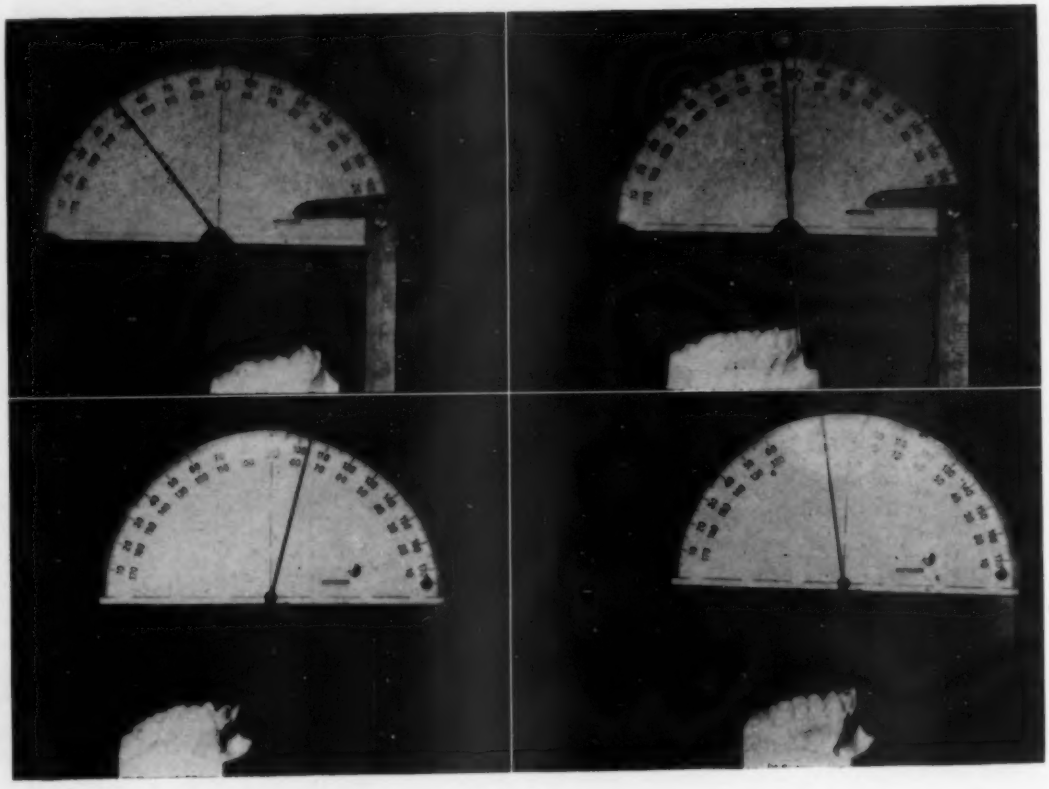
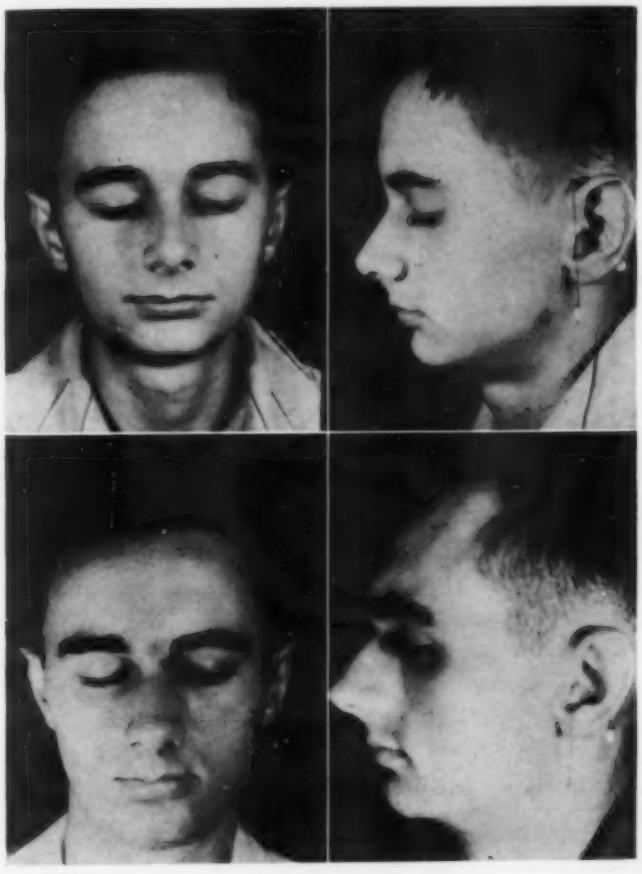


Fig. 22.

Fig. 23.



A.

B.

Fig. 24.

the angle of inclination of the anterior teeth, showed that he had a minus 48° axial inclination of the central incisors. It took sixteen months to complete this case as shown by the lower models in Fig. 20.

The protractor also showed that the axial angle of the central incisors had been changed to a minus 5°, which means a change of 40°. One of the many good features of the twin-wire appliance is that it automatically corrects the axial angle of the teeth to which it is adjusted, whether it be a minus or a plus malformation. For example, take Fig. 22, *B*, which was a typical Class II, Division 1 malocclusion. At the beginning of treatment the axial inclination of the maxillary anterior teeth was a plus 15° and at the end of treatment it was a minus 10°, a change of 25°.

Fig. 23 shows oral photographs of this case one year after all retention had been discarded. Fig. 24, *A* and *B* show the case at the beginning of treatment and five years later.

752 STARKS BUILDING.

EXTRAORAL ANCHORAGE, ITS INDICATIONS, USE, AND APPLICATION

DONALD A. CLOSSON, D.D.S.,* KANSAS CITY, MO.

THERE is nothing new about extraoral anchorage. It was discarded many years ago for intraoral anchorage, and only in the last decade has it again become more widely used, especially since Oppenheim came to this country. Occipital anchorage has a very definite place in modern-day orthodontics. It may be used in combination with most of the more popular techniques, such as the twin arch mechanism, the universal appliance, labiolingual technique, and edgewise appliance.

It is possible, with the headcap, to move maxillary molars distally, although there is no proof other than gnathostatic casts and photographs upon which to base any conclusions. Results, as with any technique, require full cooperation from the patient, and this is especially true when using extraoral anchorage. At the beginning of treatment, if it is deemed necessary to use the headgear, the parents and the patient are instructed that if full cooperation is not obtained it will not be possible to complete the case within a reasonable length of time—if at all. It is necessary, even then, in a few cases to have the patient keep a record on the calendar of his nightly cooperation. The majority, about 85 per cent, cooperate very well and after the first week seldom complain, except in hot weather or perhaps when they have a cold.

Oppenheim was a great believer in occipital anchorage, and it was his policy to give the patient a certain number of elastics and request that he return the used ones so he might count them. If any were missing, he demanded an explanation. He also would not hesitate to discontinue treatment if the cooperation was not adequate. Perhaps this was not a bad idea.

It was Oppenheim's contention that once the osteoblasts and osteoclasts were stimulated to activity, they would continue working for approximately four days after the stimulus was removed. Therefore, in using the headcap it is not necessary to be concerned about the absence of stimulation during the daytime in the majority of cases. This statement is certainly borne out in the number of patients in our office, and in others' offices, who have followed this principle of intermittent stimulation. Often there is too much tendency to be in a hurry to see results.

S. J. Kloehn, of Appleton, Wisconsin, in summarizing his paper on "Guiding Alveolar Growth and Eruption of the Teeth to Reduce Treatment Time and

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Produce a More Balanced Denture and Face," which was read at the New York meeting of the American Association of Orthodontists in May, 1949, expressed very well the most ideal time for using extraoral anchorage. He stated:

> When to start treatment is still one of the most controversial subjects in orthodontics. Treatment of the deciduous and mixed dentition has passed through various stages of popularity. The most recent school of thought has been to postpone treatment until all of the permanent teeth have erupted. This procedure often increases rather than decreases time of treatment and in some cases has permitted so much disturbance in alveolar growth and eruption that good treatment is impossible. Alveolar growth and eruption of the teeth can be guided at an early age resulting in better facial balance and a more stable denture. Simple appliances using light forces in conjunction with occipital anchorage applied over a short period of time will prevent severe malocclusions and a long period of treatment. The headcap is a most important adjunct in this treatment.

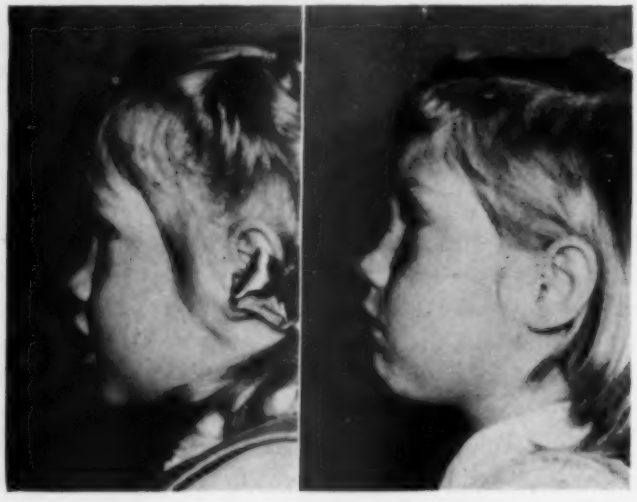

Fig. 1. Fig. 2.

Fig. 1.—Profile view before treatment of patient 4½ years of age. Treatment time, nine months. Extreme maxillary protraction was present in the deciduous dentition.
Fig. 2.—Profile view after treatment.

One of the best services that we, as orthodontists, can render is early treatment of severe Class II malocclusions. By early treatment is meant patients 4 to 6 years of age with extreme maxillary protractions and the typical facial inharmony that is associated with this problem (Figs. 1, 2, 3, 4, and 5). The pedodontist, pediatrician, dentists and physicians as a whole, should be educated to refer these patients at a very early age. More often than not we see this type of patient *after* the time when we can do the most good in the least amount of time and with the least amount of effort. Perhaps in the last few years we have been too busy to be concerned about these gross abnormalities in very young patients. The headcap may be used very successfully in treating this type of case. As a general rule the cooperation is better at this age. It also gives us the opportunity to check pernicious habits that are more difficult to break later on.

The headgear eliminates the danger of disturbing our anchorage as is often observed when Class II elastics are used, especially in the deciduous or mixed

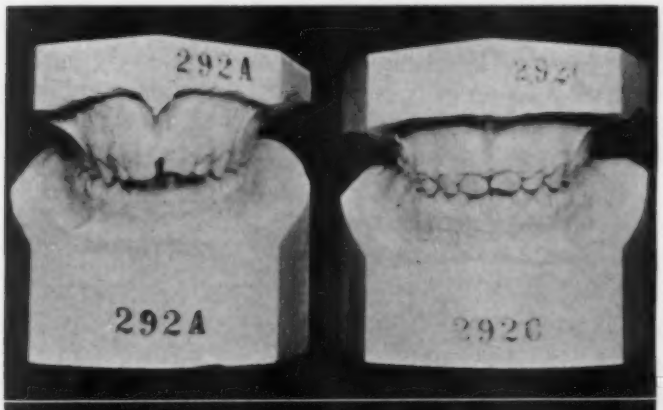

Fig. 3.

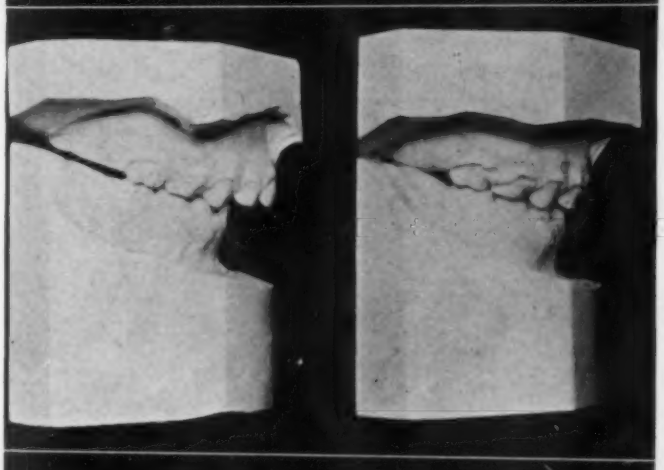

Fig. 4.

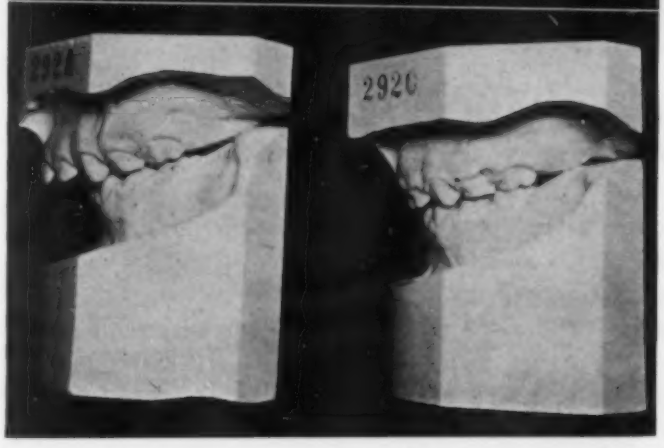

Fig. 5.

Fig. 3.—Front view before and after treatment. Whenever possible, this is the most ideal age for treatment with extraoral anchorage.

Fig. 4.—Right side before and after treatment. Molar bands on deciduous maxillary second molars. Labial arch with headgear. No appliance on mandibular arch.

Fig. 5.—Left side before and after treatment.

dentition. In the mixed dentition there is no danger of extruding the anterior maxillary teeth as is often the case. Quite often a good deal of wishful thinking is done in how much development may or may not take place in the mandible, only to find that the teeth and alveolar process have been pulled forward over their bony base. (However, there is not so much danger of this happening in the permanent dentition, especially when a full-banded appliance, such as the universal appliance, is used.) When the headcap is used the whole of the maxillary arch appears to move distally, creating a much-improved facial harmony and a very stable end result as far as the molar relationship is concerned. Later on, in the permanent dentition, the arch may need reshaping, or individual anterior teeth may need to be rotated, or perhaps the vertical overbite improved. However, the improvement in facial harmony, the opportunity for the denture to develop to its maximum inherent growth pattern, and the elimination of an inferiority complex more than justify early treatment of patients with extreme Class II malocclusion (Figs. 6, 7, 8, 9, 10, and 11).

Fig. 6.—Photograph of patient 8½ years of age at beginning of treatment. Treatment time, thirty months.

In the deciduous and mixed dentitions, aged 4 to 10, the anchor teeth are usually the deciduous second molars. The wedging action of the deciduous second molars when moved distally against the maxillary permanent first molars is most desirable. The axial position of the permanent first molars is not disturbed if the pressure is not excessive and also there is no danger of causing decalcification of the permanent molars. Quite often the incomplete root formation contraindicates placing a direct force on the first molars at an early age.

A unilateral force from extraoral anchorage is especially desirable in treating those cases in which a maxillary deciduous second molar was lost prematurely, allowing the permanent first molar to shift mesially the width of a premolar on one side and ultimately blocking out a premolar or canine.

When using the headcap in the mixed dentition, the question often arises as to what happens to the maxillary second molars. The eruption time may sometimes be retarded; however, they do not become impacted, as a general rule.

In the permanent dentition there are certain very desirable features that may be incorporated when using the headgear. It is possible, by elevating the pull of the elastics slightly above that of the occlusal plane (which is the normal

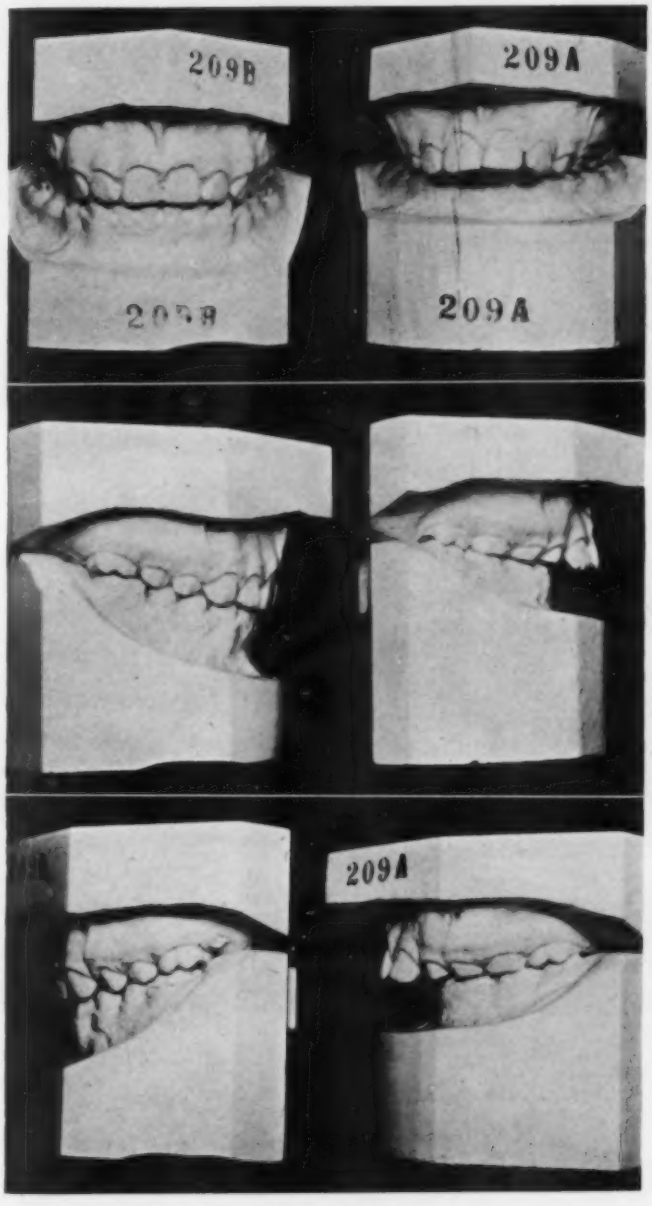

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 7.—Front view before and after treatment.

Fig. 8.—Right side. Maxillary protraction treated with extraoral anchorage, using deciduous maxillary second molars as anchor teeth.

Fig. 9.—Left side before and after treatment.

or average direction) to move the roots ahead of the crown, e.g., obtain distal root movement. This can be done only when a plain labial arch is used with no bands on the anterior teeth. Likewise, by adjusting the pull of the elastics

slightly below that of the occlusal plane, a distal tipping movement of the molar crowns may be obtained if desirable, such as in cases of ectopic eruption of the maxillary permanent first molars.

Fig. 10. Fig. 11.

Fig. 10.—Profile view after treatment.
Fig. 11.—Front view after treatment.

Fig. 12. Fig. 13.

Fig. 12.—Profile view after treatment of patient 7½ years of age. Initial treatment period, twenty-four months. Secondary treatment, twelve months.
Fig. 13.—Front view after treatment. No beginning photographs available.

Unilateral Class II cases, those in which a mesial drift of one of the maxillary buccal segments has occurred, may be treated successfully with a unilateral force from the mouthpiece and traction bar where reciprocal action from Class II elastics is not desired. This is particularly so where there has also been a mesial drift of the buccal segments of the mandibular arch (Figs. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22).

It is not intended to infer that unilateral Class II cases cannot be treated successfully with Class II elastics. There are many unilateral Class II cases

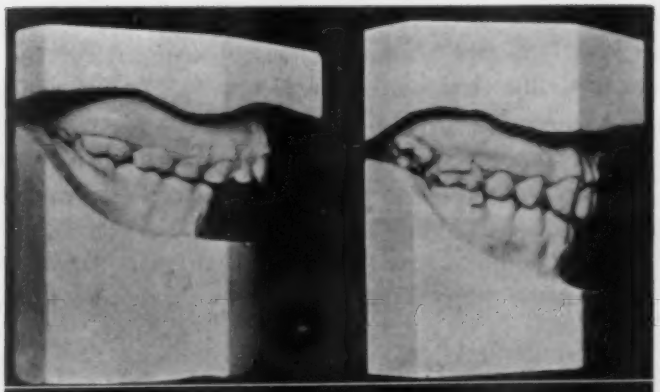

Fig. 14.

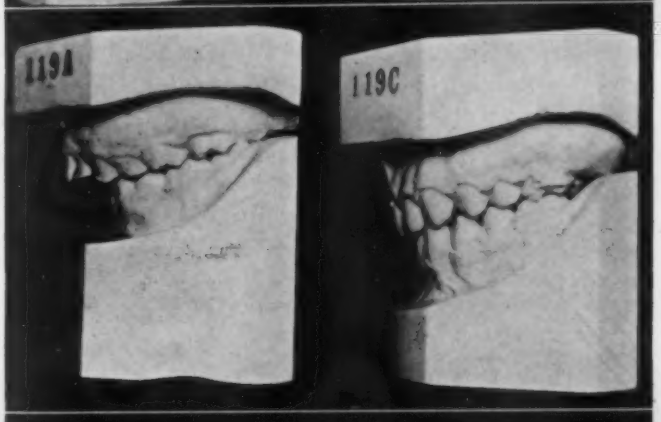

Fig. 15.

Fig. 16.

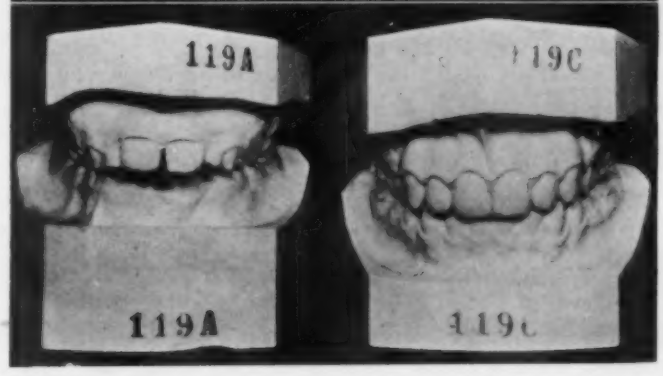

Fig. 17.

Fig. 14.—Right side before and after treatment. Maxillary protraction associated with mesial drift of mandibular buccal segments, locking out mandibular left central incisor.

Fig. 15.—Left side before and after treatment.

Fig. 16.—Lower cast showing mandibular left central incisor blocked out. Extraoral anchorage used on maxillary and mandibular arches.

Fig. 17.—Front view before and after treatment, showing mandibular left central incisor in proper line of occlusion.

that will not seem to respond favorably to treatment. It is this type of case that is often one of our biggest headaches, and by using extraoral anchorage at least it helps to shorten the treatment time (Figs. 23, 24, and 25).

In Class II malocclusion in patients aged 15 to 18, where the tissue response is slow, it may be necessary to supplement the headcap with Class II elastics during the day. Another method in Class II cases in patients a little older which works very well is to remove the maxillary second molars where it can be determined from radiograms that the third molar crowns are well-formed teeth and of approximately normal size (Figs. 26, 27, and 28). This procedure eliminates the removal later on of the maxillary third molars which may become impacted or cause relapse. The only objection is that the third molars sometimes erupt before the first molars are moved distally as far as is desired. The remarkable thing about removing maxillary second molars is the very favorable axial position, after eruption, the third molars invariably assume. The contact with the first molar always seems to be good, and often this procedure is the difference between failure and success in older patients. At least it is not as radical as the promiscuous removal of premolars.

Fig. 18. Fig. 19.

Fig. 18.—Profile view of patient 9 years of age. Treatment time, thirty-eight months. No available photographs at beginning of treatment.
Fig. 19.—Front view following treatment. No beginning photographs available.

All patients appreciate concealing our appliances as much as possible, and this is often done by making the arch wire removable during the day. The patient is instructed to place the arch in the molar tubes at the time the headgear and assembly are worn each night. Very little, if any, distortion is observed in the arch wire providing, of course, that they are careful.

There are many Class II cases in which the vertical overbite is not excessive and in which there is no problem of rotations in the anterior teeth which may be entirely corrected with a plain labial arch and headgear. However, it may be necessary to stabilize the mandibular anterior teeth with a lingual arch when the lingual inclined planes of the maxillary anterior teeth begin to ride the mandibular anterior teeth as the maxillary arch is moved distally.

Extreme bimaxillary protractions, or other cases in which it is deemed necessary to extract four premolars, especially patients aged 10 to 18, may be treated without using the posterior teeth as reciprocal anchorage to close the space. This is most desirable where there is a pronounced facial inharmony and the treatment plan is to retract the maxillary and mandibular anterior seg-

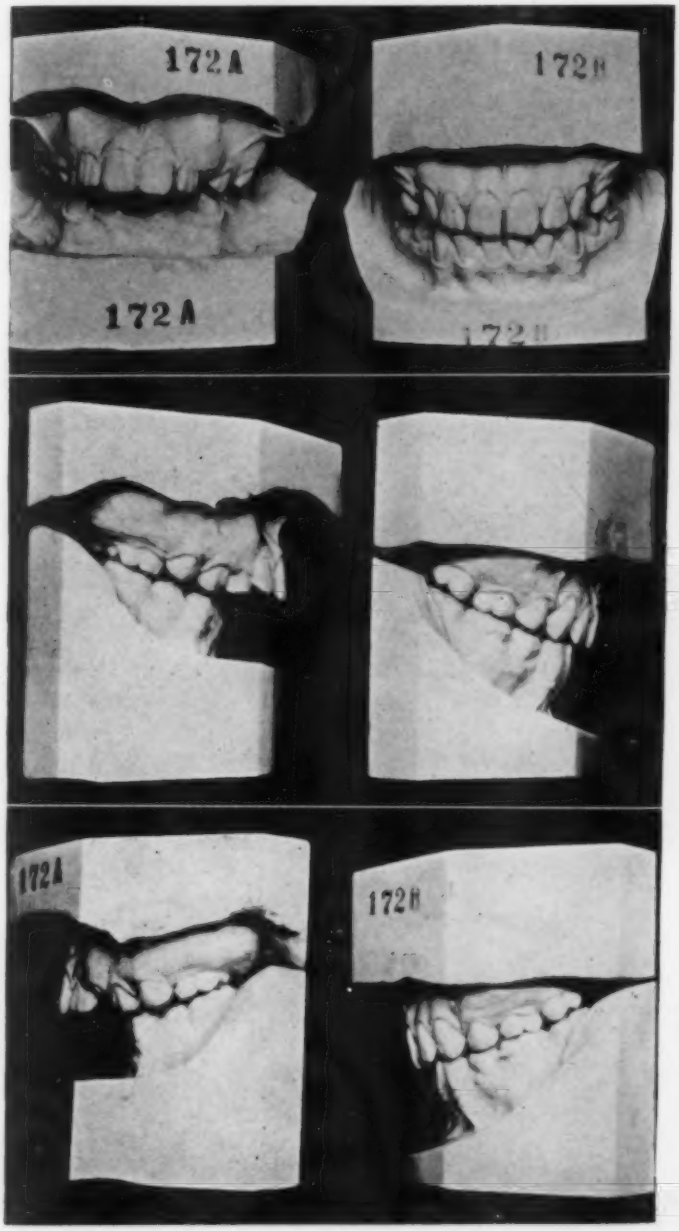

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 20.—Front view. Extreme maxillary protraction in which the mandibular cuspids were blocked out and Class II elastics were contraindicated. Maxillary and mandibular first premolars were extracted.

Fig. 21.—Right side before and after treatment.

Fig. 22.—Left side before and after treatment.

ments. In this case two traction bars and mouthpieces are used from the headgear. It is necessary to adjust the pull of the elastics parallel to the occlusal plane of each arch.

There is no set rule on how much pressure should be applied from the elastics. What appears to work advantageously for one patient may not be

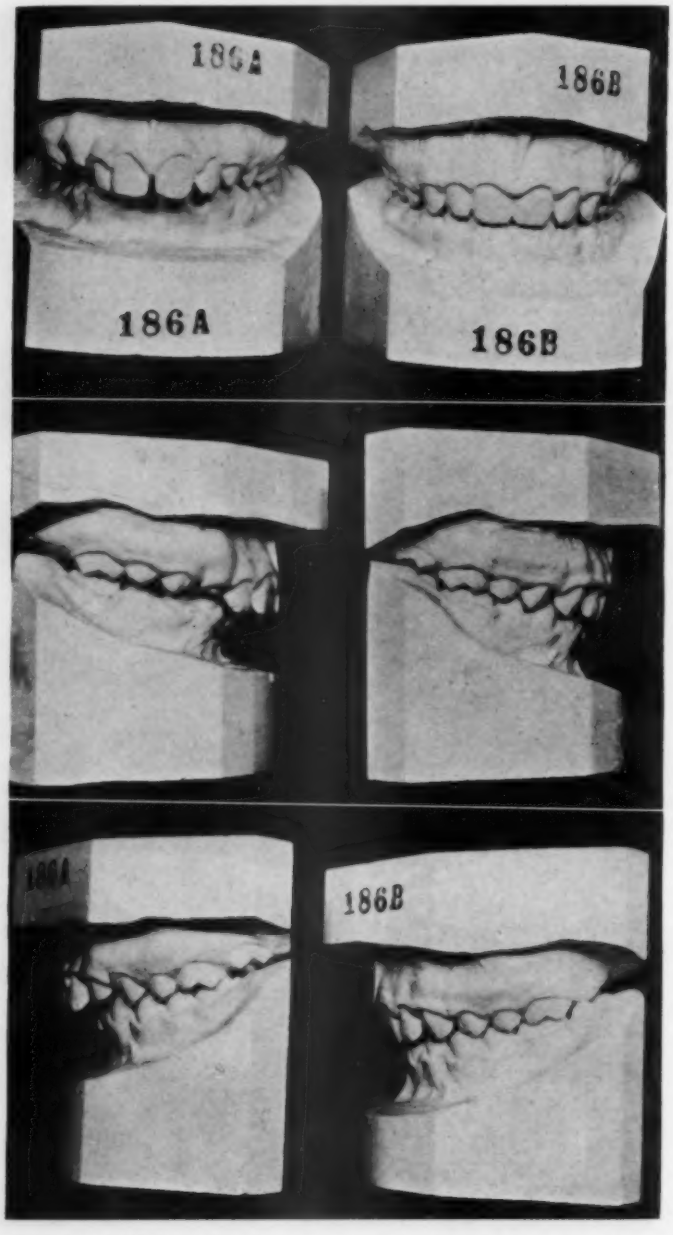

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 23.—Front view of boy 10 years of age. Treatment time, twelve months. Unilateral Class II, Division 1 in which the maxillary left second molar was removed since a well-formed third molar crown was present in the x-rays.

Fig. 24.—Right side. The appliances in this case consisted of an 0.040 inch labial maxillary arch, using extraoral anchorage, and a mandibular lingual arch. The only teeth banded were the maxillary and mandibular molars.

Fig. 25.—Left side. Note the change in molar relationship. Maxillary left third molar unerupted at this time.

correct for another. As a general rule a light elastic with a rather long pull is better than one that is heavy with a short pull. The force must be varied with the age of the patient and the tissue response. Full cooperation must be obtained to determine correctly the amount of force to be used. If the cooperation is not adequate, the operator may be misled into increasing the amount of

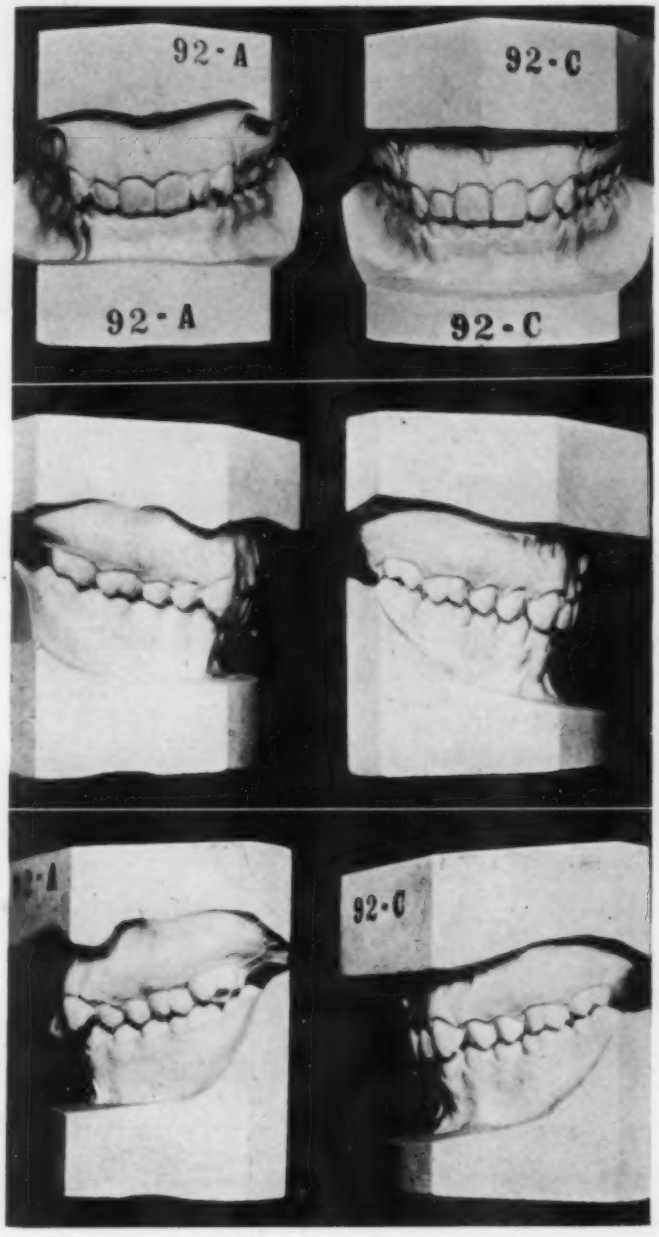

Fig. 26.

Fig. 27.

Fig. 28.

Fig. 26.—Front view of girl 15 years of age. Treatment time, twenty-three months. Class II, Division 2 in which the maxillary second molars were removed.

Fig. 27.—Right side. Note the favorable position the maxillary right third molar has assumed following treatment.

Fig. 28.—Left side. The third molar on the left side has likewise assumed a favorable position. It must be determined from x-rays that a well-formed third molar crown is present before removing the maxillary second molars.

Fig. 29.—Molar buccal tubes are aligned occlusogingivally so the arch wire lies at the gingival third of the anterior teeth.

Fig. 30.

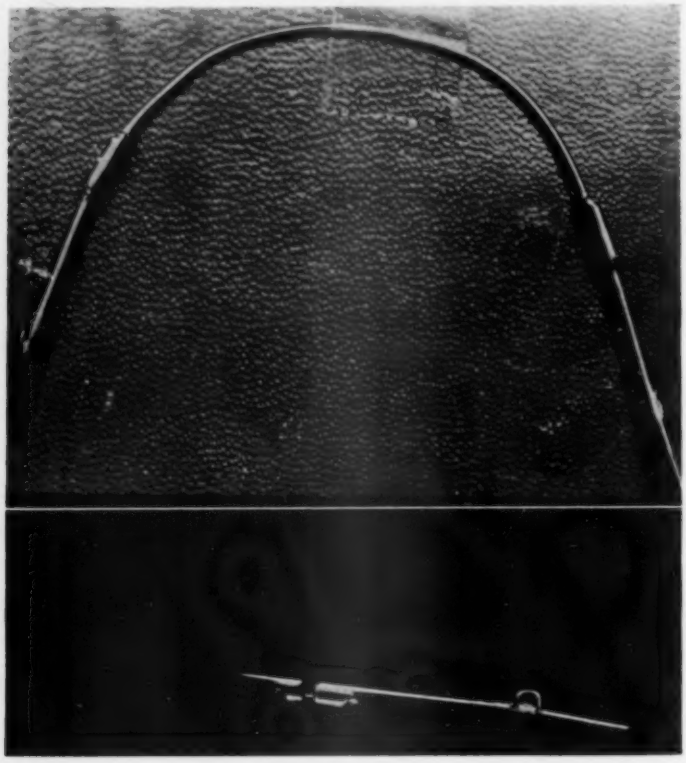

Fig. 31.

Fig. 30.—Occlusal view of arch wire with tubes for mouthpiece.

Fig. 31.—The arch wire is made of 0.040 inch stainless alloy wire. Stainless alloy wire, 0.016 inch is used for the fixed or welded loop stops. Round buccal tubes 0.040 inch are soldered to the occlusal side of the arch wire distal to the cuspids for the reception of the mouthpiece.

force when it is not indicated. It requires considerably more force to move all of the teeth at once than if applied only to the molars.

The headgear seems to work better in the majority of cases when the force is applied only to the molar teeth (Class II cases) except in the deciduous dentition in patients aged 4 to 6. It usually requires three to six months, with good cooperation, to determine noticeable progress or change in the molar relationship. Spacing between the molars and premolars is the result of excessive force from the elastics. If this occurs, the stops in front of the molar tubes should be closed, thus applying the force on the anterior teeth until the contact areas are again closed. The arch should then be adjusted labially to the anterior teeth and the pressure reduced. It is not unusual to observe rotations of the anterior teeth unfold or partially correct themselves as the buccal segments move distally when treating with the headcap.

Fig. 32.

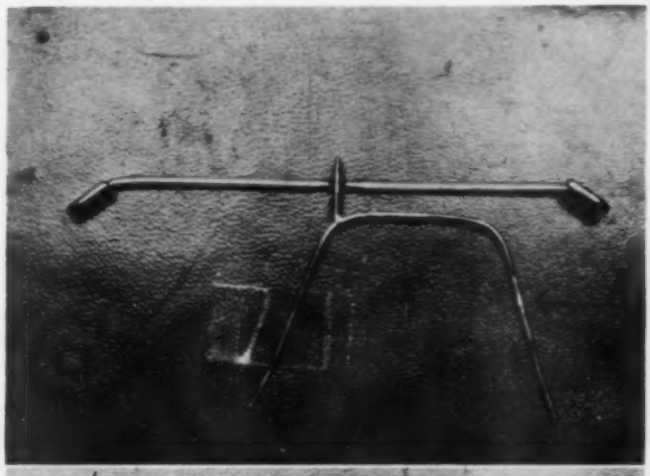

Fig. 33.

Fig. 32.—Traction bar offset to one side of mouthpiece for left unilateral force. A small amount of solder (*A*) is placed on the (patient's) right side of the mouthpiece for identification purposes.

Fig. 33.—Stainless alloy wire, 0.070 inch, is used for the traction bar (*A*). A section of 0.040 inch round tubing is soldered to the traction bar to form a swivel joint with the mouthpiece. The mouthpiece is fabricated of 0.040 inch stainless alloy wire.

It goes without saying that it is necessary to have well-fitting molar bands that will provide the maximum amount of mechanical retention. The molar tubes are 0.040 inch inside diameter and should be aligned occlusogingivally so the arch wire lies at the gingival third of the anterior teeth (Fig. 29). The size of the arch wire is 0.040 inch which affords the maximum stability and reduces breakage to a minimum. A fixed or welded loop stop is used in preference to an adjustable stop against the molar tubes (Fig. 31). Round buccal tubes, 0.040 inch, are soldered to the occlusal side of the arch wire distal to the

Fig. 34. Fig. 35.

Fig. 36. Fig. 37.

Fig. 34.—The headcap is made of 1½ inch black belting. A V-shaped notch is cut in the temporal portion before it is stapled to the occipital portion.

Fig. 35.—The top of the temporal portion is cut on the bias to conform to the shape of the head.

Fig. 36.—The horizontal or cervical portion of the headcap must be adapted well below the occipital bone in order for the pull of the elastics to stay constant. The width for this portion is one-half the width of the belting.

Fig. 37.—Direction of pull from the elastics is adjusted to the same horizontal plane as the arch wire or just slightly above.

cuspids for the reception of the mouthpiece. Placement of the buccal tubes on the labial arch wire may be simplified by spot welding a section of flat wire (such as 0.010 by 0.020 inch) to the tubes and then welding the flat wire to the arch. This is then reinforced with 14 carat gold wire solder (Fig. 30 and 31).

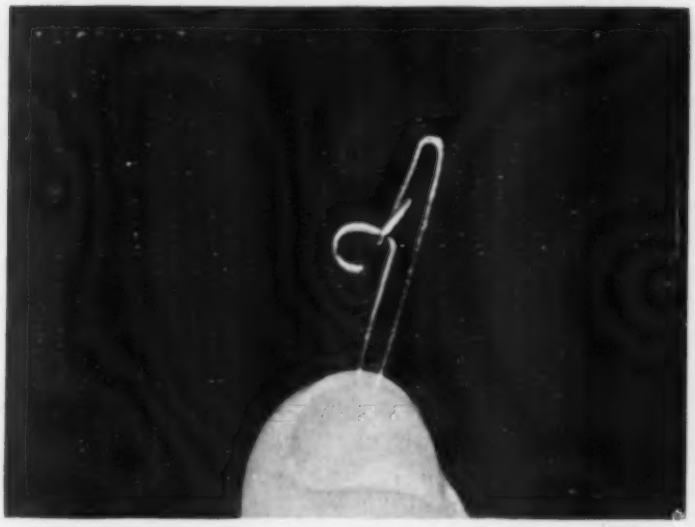

Fig. 38.—Annealed wire 0.030 inch is used to form the hook that is attached to the headgear.

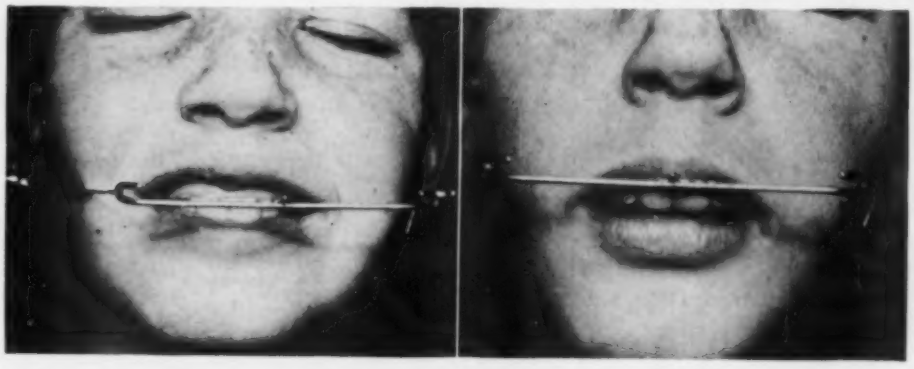

Fig. 39. Fig. 40.

Fig. 39.—Complete assembly with unilateral force on left side.
Fig. 40.—Complete assembly showing mouthpiece and traction bar in place.

Fig. 41. Fig. 42.

Fig. 41.—Front view of headcap and complete assembly.
Fig. 42.—Side view of headcap and complete assembly.

The mouthpiece is simply an auxiliary arch to which is attached the traction bar (Fig. 32). This assembly, that is, the traction bar and mouthpiece, is inserted by the patient. A small amount of solder is placed on the (patient's) right side of the mouthpiece for identification purposes, so if a unilateral force is used the traction will be on the correct side each time the mouthpiece is inserted (Fig. 32). The traction bar is of 0.070 inch stainless alloy wire and is attached to the mouthpiece by a swivel joint (Fig. 33).

The headcap is made of 1½ inch black belting (Fig. 34). The material is stapled together so that it may be altered if necessary (Fig. 35). The most important feature in its construction is to adapt the portion in the back of the neck well below the occipital bone, or the pull from the elastics will not stay constant (Fig. 36). The direction of pull from the elastics is adjusted parallel to the occlusal plane or just slightly above in order to obtain bodily tooth movement of the anchor teeth (Fig. 37). The hooks that are attached to the headgear are made of 0.030 inch annealed wire (Fig. 38).

The traction bars and hooks are made up in advance to conserve chair time. The headcap is usually made while the cement is setting on the molar bands. An efficient assistant may be taught to make the headcaps if desired. (See Figs. 39, 40, 41, and 42, for complete assembly.)

CONCLUSIONS

The headcap is most desirable for treatment in young patients as a means for guiding alveolar growth at an early age.

Positive control of molar teeth in relation to their axial position results in a more stable end result as far as retention is concerned.

The amount of time spent at the chair is reduced, and there are longer intervals between visits.

The average patient will cooperate in the use of the headcap, as well as with intermaxillary elastics, providing the headcap is comfortable.

Positive improvement in facial balance is obtained when using the headgear in extreme Class II cases.

The head cap eliminates the danger of disturbing anchorage, particularly when treating in the deciduous and mixed dentition.

REFERENCE

Kloehn, S. J.: Guiding Alveolar Growth and Eruption of the Teeth to Reduce Treatment Time and Produce a More Balanced Denture and Face, Read at the New York meeting of the A.A.O., May, 1949.

205 Brookside Theatre Building.

A STUDY OF THE ANGULAR RELATIONSHIP IN THE UPPER AND LOWER ANTERIOR TEETH

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CONSIDERABLE attention is continually being focused upon the vertical position (labiolingually) of the lower incisor teeth in relationship to the inferior border of the mandible as an important factor in the diagnosis and treatment of malocclusion.

Tweed[1] was one of the first to call attention of the profession to this problem. He observed that following orthodontic therapy the lower incisors were frequently tipped forward becoming relatively procumbent, thus placing these teeth in unstable positions and at times producing an appearance of fullness about the mouth and lips which is symptomatic of so-called bimaxillary protrusion. He contended that if the lower incisors were positioned upright over medullary and basal bone and at right angles to the inferior mandibular border this would markedly lessen the tendency to relapse, it would lessen the tendency to a future crowding of the lower anterior teeth, and it would improve facial esthetics. Whether the increased stability of these teeth when placed in this vertical relationship is due to the fact that the roots may be surrounded by a greater amount of alveolar bone, or whether the behavior of natural teeth is considered to be similar to that of artificial teeth when they are placed directly over the ridge as advocated by the prosthodontist, or whether the increased stability is due to other factors has not been clearly explained.

Others,[2, 3] on the other hand, have demonstrated by means of roentgenographic cephalometry that the lower incisors frequently show a tendency for their axial inclinations, if they have been altered during treatment, to change or return toward their original positions following the removal of all appliances. We, therefore, find in the instances cited that the clinical observations, as reasonable and as apparent as they may seem to be, may be at variance with some scientific findings.

Further investigations upon the vertical position of the lower central incisor in relationship to the mandible were made by Margolis,[4] Noyes, Rushing and Sims,[5] Speidel and Stoner,[6] Brodie,[7] and others.[15] These studies were made from lateral x-ray headplates employing the various x-ray apparatus and cephalometric techniques used in orthodontics. Upon the tracings obtained from these x-ray plates, the investigators usually drew two lines, one horizontal and one vertical. The horizontal line was drawn tangent to the tracing of the projected inferior border of the left side of the mandible. The

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vertical line was drawn upon the tracing of the projected outline of the mandibular left central incisor extending from the incisal point through the apex and continuing downward to intersect the horizontal line. The angle formed at the intersection of these two lines is usually referred to as the incisor-mandibular plane angle, as seen in Fig. 1 taken from Margolis.[4] The horizontal line is usually considered to be representative of a plane tangent to the inferior mandibular border, while the vertical line is considered to be representative of the long axis of the mandibular incisor.

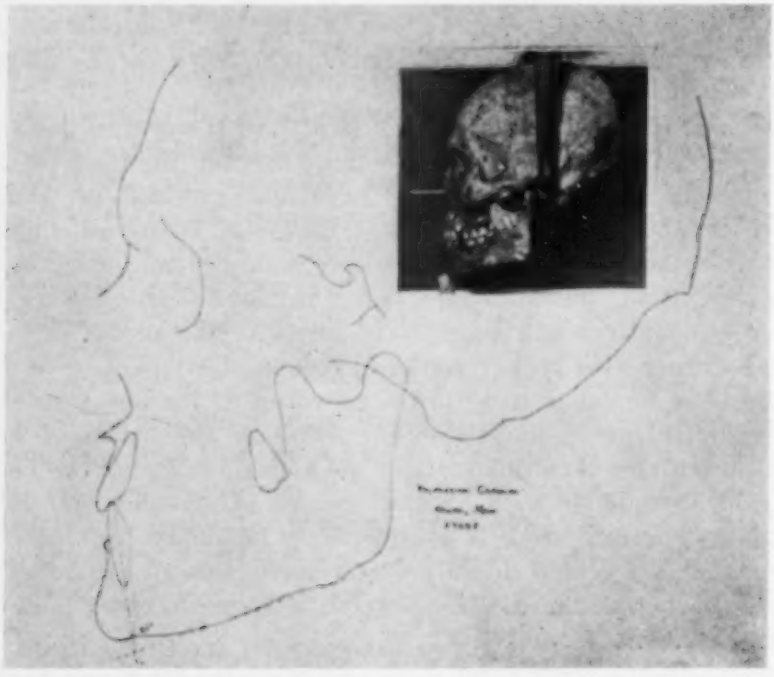

Fig. 1.—Method of constructing incisor-mandibular plane angle. (From Margolis, H. I.: Am. J. Orthodontics and Oral Surg. 29: 571, 1943.)

These investigations were carried out on patients exhibiting both normal and abnormal occlusion. As the method of sampling and statistical techniques employed were not exactly alike in each of the studies mentioned, a comparison of their results must be made with some degree of reservation. In the studies of the incisor-mandibular plane angle found in normal occlusion, one series[6] exhibited an average angle of 92.64° with a standard deviation of 6.15°; in another study[5] it was found to be 89.4° with an average deviation of 4.6° in living individuals, while on skulls the average angle was 92° with an average deviation of 4.2°; in a third study[4] the average was referred to as being 90° with a standard deviation of 3°. In addition to the rather large standard deviation, the studies exhibited a rather large range of variation on both sides of the average angle.

Despite these studies frequent reference[8, 9, 10] is continually being made to the fact that a 90° incisor-mandibular plane angle always exists in normal occlusion and that this specific angular relationship should be attained in

the treatment of all cases of malocclusion. However, in one of the studies[7] on the character of the angle present in cases of malocclusion, the mean angle in Class 1 cases was found to be 90.9°, in Class II, Division 1 it was 89.3°, while in Class II, Division 2 it was 86.6°. It is quite obvious, therefore, that in these studies the average incisor-mandibular plane angle found in cases possessing malocclusion fell well within the normal range of the angle as found in normal occlusion.

In addition to relating the vertical position (labiolingually) of the mandibular central incisor to the inferior mandibular border, some of the investigators related the position of this tooth to other planes such as the Frankfort horizontal plane, the occlusal plane, the plane tangent to the posterior border of the ramus, and also to the vertical axis of the upper central incisor. Some of the investigators have somewhat modified their viewpoint regarding the constancy of a 90° incisor-mandibular plane angle being present in all cases of normal occlusion; in fact, it has been suggested by some that this specific relationship applies to selected cases.

It has been further demonstrated that the gonion and chin angles, the length of the rami and their departure anteriorly or posteriorly from a vertical axis, the amount of bone present in the chin region, the distance of the incisors from the chin plane, and the angular relationship between the cranial and facial portions of the head are factors that should be taken into consideration when studying the procumbency of the mandibular incisors as related to the horizontal position of the inferior mandibular border and the facial characteristics associated with procumbency. These factors have been pointed out by Higley,[11] Bjork,[12] Corlett,[13] and Salzmann.[14] Outside of the field of orthodontics, Morant,[16] in a very careful and exhaustive study of the mandible, made some pertinent observations. His measurements showed a positive correlation between the gonial angle and the height and breadth of the ramus. This suggests that the gonial angle is a function of the size and proportions of the ramus. His studies further stressed the degree that the various parts of the mandible play in influencing the horizontal position of its corpus. In addition, a marked sexual differentiation was found to exist in the mandible which is usually not given much consideration in orthodontic literature.

By referring to Fig. 2, which is a tracing of a lateral x-ray headplate taken from Wylie's article[17] upon which the author has drawn in the incisor-mandibular plane angle it can readily be seen that while the long axis of the mandibular central incisor is at right angles to the tangent of the projected inferior mandibular border, the mandibular incisors are decidedly procumbent, in fact almost horizontal. In this instance, the right angled incisor-mandibular plane angle is neither an indicator of the procumbency of the lower incisor nor of the horizontal position of the lower border of the mandible. ***Therefore, a distinction should be made between procumbency, per se, and the vertical relationship of the mandibular incisors with the inferior mandibular border.***

Furthermore, additional information should be obtained regarding the stability of procumbent mandibular incisors in untreated cases of normal and abnormal occlusion. There is probably general agreement, at least from a clinical standpoint, that where the procumbency is increased as the result of orthodontic treatment, the state of relative stability of the mandibular incisors will be considerably reduced.

Fig. 2.—Right angled incisor-mandibular plane angle drawn upon tracing of lateral x-ray headplate. (Original tracing of headplate taken from Wylie, W. L.: AM. J. ORTHODONTICS AND ORAL SURG. 32: 57, 1946.)

As mentioned previously a considerable amount of the investigations made upon the incisor-mandibular plane angle have been through means of roentgenographic cephalometry. It has been common practice lately for investigators using this means of approach to introduce a great variety of linear and angular measurements into their studies of the many dentofacial problems. Care should be exercised in making interpretations from these data because of the fact that x-ray films merely record the shadows *projected* upon their sensitive surfaces by the passing of x-rays through objects. This introduces a number of variable factors which should be taken into consideration. It has frequently been demonstrated that a variable amount of magnification, reduction, and distortion is obtained if the actual measurements of the object are compared with those obtained from their x-ray projection. The amount of this discrepancy is dependent upon the tube object, tube film, and object film distance. Furthermore, the angle formed by the central ray with the object and with the film and also the angle formed between the object and film are other factors affecting the amount of distortion. It should be borne in mind that in x-raying any three-dimensional object and

thereby projecting it upon a plane surface, certain geometric problems are introduced such as the discrepancy between true and projected angles[24, 25] in certain instances, altered linear dimensions, and other factors pertaining to projection which, if not taken into consideration, may give rise to misinterpretation.[18] Adams[19] showed in roentgenographic cephalometry that an unequal magnification of sufficient magnitude to be taken into consideration in our work exists *even* in areas situated in the midsagittal plane which is supposedly parallel to the film and at right angles to the central ray at one point. Bjork,[12] in his excellent monograph, "The Face in Profile," considered several types of errors in roentgenographic cephalometry such as errors inherent in photographic projection, errors obtained in the location of anatomical landmarks, in addition to other minor errors. He demonstrated that errors made when comparing two consecutive x-rays of the same head several days apart using the same apparatus and technique and analyzed by two similarly trained investigators amounted to about 3 per cent. He further demonstrated that certain landmarks exhibited greater precision of location than others. He related the long axis of the mandibular central incisor only to the occlusal plane and to the long axis of the maxillary central incisor.

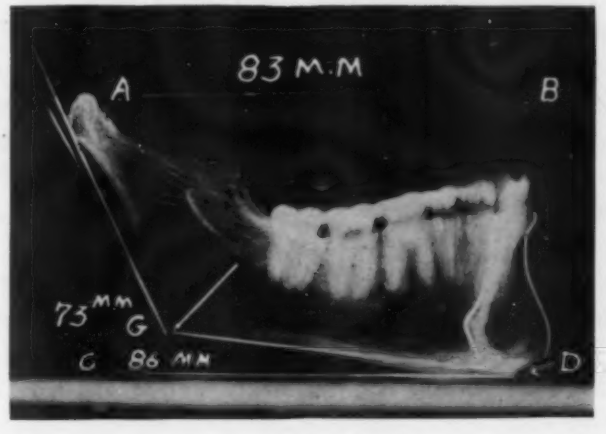

Fig. 3.—Lateral x-ray of mandible in fixed position showing projected measurements of wires AB, CD, GD, actual measurement of each wire being 83 mm. (X-ray taken by Dr. L. M. Ennis.)

To elucidate further upon several of the aforementioned observations relating to radiography, the following procedure was employed, as illustrated in Fig. 3. Wires of equal length, 83 mm., were used and located in the following manner. Wire *AB* was attached directly to the film parallel with it and with the midsagittal plane of the mandible that was x-rayed. Wire *CD* was placed in the midsagittal plane of the mandible which was parallel with and 50 mm. removed from the film, while wire *GD* was attached tangent to the inferior mandibular border extending obliquely from a point directly beneath gonion to a point directly beneath gnathion. The target was located five feet from the film with the central ray directed at right angles to the midsagittal plane of the mandible and film, at the level of the third molar.

Every possible means was employed to maintain these specific relationships of all of the parts during the entire procedure. Following the x-raying of this mandible as described, the length of the wires as projected upon the film was measured with the following results. The projected length of the wire *AB* practically equaled its actual length because it was placed directly upon and parallel to the film. The projected length of wire *CD* as measured on the film was 86 mm., an increase or magnification of 3 mm., or approximately 3.6 per cent, due to the distance of this wire from the film even though it was placed parallel to the film. The projected length of wire *GD* as measured on the film was only 73 mm., a decrease of 10 mm., or approximately 12 per cent, from its actual measurement. This discrepancy in measurement is due primarily to the obliquity of wire *GD*. This demonstrates that the measurements of dimensions of bones after being projected upon x-ray films vary from the actual measurements depending upon their distance from, and upon the degree of obliquity of, the plane measured to the film. These two factors conduce to distortion, i.e., magnification and reduction, respectively.

Due to the distance of the lower central incisor from the film which would produce magnification, and as wire *GD*, the tangent to the inferior mandibular border, is foreshortened upon projection, the projected angle, the incisor-mandibular plane angle, may not be the same as the true incisor-mandibular plane angle. In addition, such factors as the deviation of the central ray with respect to the incisor-mandibular plane angle, as it is usually directed through the auditory meati, and the difficulty at times of defining and maintaining a true midsagittal plane parallel to the film will further alter the accuracy of projection.

This critical analysis is in no way intended to minimize the importance of the use of roentgenographic cephalometry in the study of our many problems. It is probably one of the most valuable instruments for research that we have at our disposal. A great deal of excellent work has already been done with it, both in respect to the study of the incisor-mandibular plane angle and in the analysis of many other problems. However, it should be understood that there are inherent errors in the use of this technique just as there is in any other method of measurement of anatomical structures which should always be taken into consideration in the interpretation of findings before too stringent, rigid, or exacting criteria are propounded for clinical guidance.

In this study of the mandible, using wires of known length, the variability of the definition and projection of the mandibular base line has been pointed out. This is one of the lines used in determining the incisor-mandibular plane angle. The possibilities of variation in the other side of this angle, namely, the long axis of the lower central incisor, will now be considered.

I am indebted to Dr. LeRoy M. Ennis, Professor of Roentgenology at the Dental School, University of Pennsylvania, for his assistance and suggestions in carrying out part of this x-ray demonstration.

As mentioned previously, the line representing the long axis of the lower central incisor was drawn upon the tracing of this tooth, extending from the incisal point through the apex and continued until it intersected the tangent to the inferior mandibular border. On many of the tracings of this feature that have been published, the longitudinal line seems to extend as a continuous straight line from the incisal point to the apex directly through the center of the crown and root, which would make it truly representative of the long axis of this tooth. However, if natural mandibular central incisors are examined that have been ground longitudinally to their midsagittal plane, it is frequently apparent to the eye that the crown and root are not exactly in the same vertical plane, i.e., there appears to be an angle between crown and root. Kaletsky,[20] in order to obtain more accurate dental radiographs, studied the crown root angle of the teeth. Fischer,[21] by means of an oriented mandibular radiogram and sectioned oriented cast, demonstrated a crown root angle being present in the mandibular incisors. Wheeler[22] also called attention to the fact that the incisal edge of the mandibular central incisor is not directly over its apex. Therefore, as this angle does exist,[23] it should be taken into consideration when computing the incisor-mandibular plane angle, both from an anatomical and a functional standpoint, as it may have some bearing upon the occlusion and position of the incisors. To obtain more data on the character of the crown root angle of the anterior teeth, it was decided to investigate this problem in the following manner.

One hundred mandibular central incisors, one hundred mandibular lateral incisors, one hundred mandibular canines, and a similar number of corresponding maxillary teeth that were ground longitudinally to their midsagittal plane were employed in this investigation. The amount of error obtained as the result of inaccuracy in grinding by either not attaining the exact midsagittal plane, or as the result of a slight amount of obliquity, was checked and found to be insignificant. Four different angles were measured upon each one of the aforementioned teeth. The landmarks used in locating the four angles can be observed in Fig. 4. They are as follows:

a, Incisal point, a point on the midsagittal plane, 1 mm. below the incisal edge midway between the labial and lingual surfaces.

c, Center of neck of tooth, a point on the midsagittal plane, midway between the labial and lingual surfaces at the level of the cementoenamel junction.

b, Apical point, a point on the midsagittal plane at the center of the apical end of the root.

ac, Central crown axis, line (axis) connecting points *a* and *c*.

cb, Central root axis, line (axis) connecting points *c* and *b*.

y, Approximate position where a tangent to the labial surface of the crown contacts the tooth.

x, A point on the labial midsagittal surface of the tooth at the cementoenamel junction.

The following are the four angles used and can be seen by referring to Fig. 5, *A*, *B*, *C*, and *D*, *respectively:*

Angle 1, Fig. 5, *A*.—The angle formed at the point *c*, the junction of the central crown (*ac*) and central root (*cb*) axis. This angle demonstrates the crown root angle quite clearly.

Angle 2, Fig. 5, *B*.—The amount of angular deviation of the long axis of the tooth as usually obtained from x-ray tracings (line passing directly from incisal point to apex) from the central root axis (*cb*). This demonstrates that the long axis of the tooth as frequently obtained in roentgenographic cephalometry does not necessarily pass through the center of the crown and root simultaneously.

Angle 3, Fig. 5, *C*.—The angle formed at the junction of a line passing from point *a* to point *x* to a line running parallel to the central root axis from point *x*.

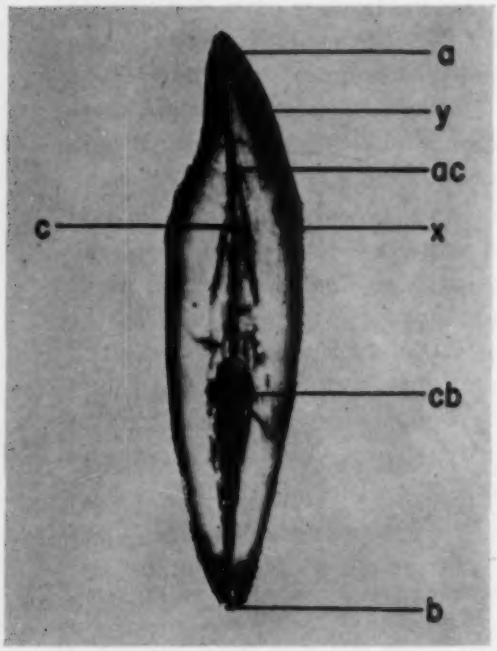

Fig. 4.

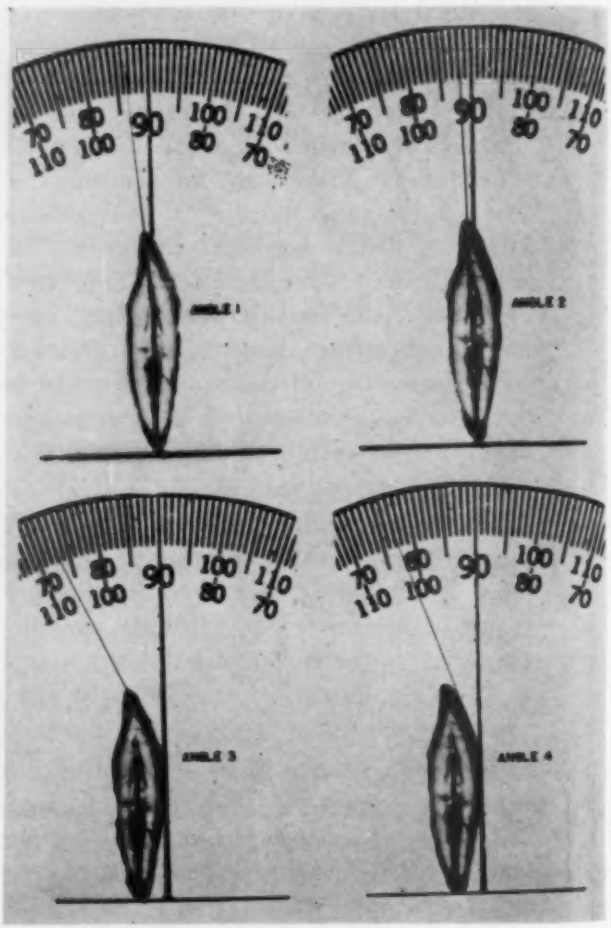

Fig. 5.

Fig. 4.—Longitudinal section of mandibular central incisor ground to midsagittal plane, showing location of landmarks used in measuring crown root angle of anterior teeth. See text for detailed explanation.

Fig. 5.—Method of constructing Angles 1, 2, 3, and 4 used in studying crown root angle of anterior teeth.

Angle 4, Fig. 5, *D*.—The angle formed at the junction of a line tangent to the labial surface of the crown and a line running parallel to the central root axis from point *x*.

Angles 3 and 4 have been suggested by Dr. W. M. Krogman, Professor of Physical Anthropology, Graduate School of Medicine, University of Pennsylvania, to study crown root angulation further.

TABLE I. CROWN ROOT ANGLES OF HUMAN ANTERIOR TEETH

		CENTRAL INCISOR				LATERAL INCISOR				CANINE			
		/1	/2	/3	/4	/1	/2	/3	/4	/1	/2	/3	/4
Maxillary Jaw	Avg.	174.12	177.68	160.34	164.36	173.88	177.46	160.94	165.30	176.84	179.20	163.68	167.50
	S.D.	2.31	1.43	3.35	3.03	2.12	1.31	3.61	2.96	1.89	0.79	3.36	3.34
Mandibular Jaw	Avg.	174.44	177.62	164.98	166.00	173.73	177.33	160.98	165.29	174.21	177.67	159.78	165.33
	S.D.	1.79	1.16	4.86	3.43	1.94	1.26	2.87	2.91	2.71	1.44	3.42	3.39

Avg. = Average.

S.D. = Standard deviation.

Measurements recorded in degrees.

For explanation of /1, /2, /3, /4, see text.

Total number of teeth measured, 600.

Sample of each type of tooth measured, 100.

The averages and the standard deviations of the four angles measured upon the one hundred mandibular central incisors, one hundred mandibular lateral incisors, and one hundred mandibular canines can be seen by referring to Table I. These measurements demonstrate the character of the crown root angle. The low standard deviation of Angle 1 indicates a low range of variability of the crown root angle in the teeth measured. In any consideration of the long axis of these teeth it would seem that this angle is of sufficient magnitude to be of some significance.

To obtain a more complete picture of the angulation of the anterior teeth of man, the procedure just described was used in calculating similar four angles in one hundred maxillary central incisors, one hundred maxillary lateral incisors and one hundred maxillary canines. The averages and standard deviations of these angles are also shown in Table I. It is interesting to note the same features pertaining to the crown root angles in the maxillary anterior teeth as found in the mandibular anterior teeth. There is also a close similarity between like angles in comparable maxillary and mandibular teeth. While this study is limited to a morphologic viewpoint of the crown root angle in individual teeth, nevertheless, this angle may have some bearing upon the occlusion of the anterior teeth.

The construction and reading of the incisor-mandibular plane angle as usually derived from x-ray tracings of lateral headplates may seem to be a very simple and reasonable procedure to follow; however, a careful analysis of the structures that make up this angle shows that it is more complex than may appear at first glance and the mere reading of the angle may give rise to misinterpretations as it may mask many variable anatomical features. Although it may seem that an overemphasis has been placed upon certain details in this presentation, nevertheless, they appear to be of sufficient importance to be taken into consideration. The impression apparently is held by some that roentgenographic cephalometry, due to its exacting standards, is without error, and therefore strict interpretations from those findings may be made.

While the principal object of this investigation was merely to study the crown root angle of the anterior teeth, this angle is directly related to the incisor-mandibular plane angle and, due to the importance placed upon this latter angle at the present time, it was decided to study this relationship at the same time.

To summarize some of the salient points discussed in this presentation it may be stated that:

1. The incisor-mandibular plane angle is not a true indicator of the procumbency of the mandibular central incisor at all times.

2. A consideration of the possible extent of error due to projection in computing this angle from x-ray tracings has not been done or at least not mentioned by many investigators.

3. The vertical line used in representing the long axis of the mandibular central incisor does not indicate the presence of a crown root angle, and as

this angle does exist it may have some bearing upon the anatomy, function, and occlusion of the parts under consideration.

4. The crown root angles of the maxillary and mandibular anterior teeth of man have been measured and their averages and standard deviations have been calculated.

In conclusion it may be stated that this material is presented in the hope that interpretations from projected tracings be made by exercising sufficient latitude, especially when they apply to diagnosis and treatment.

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CENTRAL MEDICAL BUILDING.

PSYCHOSOMATIC CONSIDERATIONS IN ORTHODONTICS

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ORTHODONTICS has progressed in comparatively recent years from the realm of pure mechanics to that of a mechanical art based upon a scientific and biologic background. Although the prime consideration of the orthodontist is the establishment of an adequate and healthy occlusion, in making his diagnosis he has come to realize more and more the necessity for evaluating the biologic and physiologic totality of his patient. As part of the routine history taking in the orthodontic office, there is an investigation into the constitutional background of the patient. The orthodontist is interested in his patient's birth and development, past and present nutrition, past and present states of health, oral, dental, and general. Allergies, endocrine functions, and circulatory and respiratory phenomena all have their significance in orthodontic diagnosis. In short, the orthodontist has attempted to keep pace with the advance of medical knowledge and to relate the newer concepts of medicine to his orthodontic practice. In this light, the current concept of psychosomatic medicine should be evaluated as to its application to orthodontics.

The theory that there is a relationship between psyche and soma, the mind and the body, is not a new one. As early as 380 B.C. it was expressed by Aristotle, who wrote, "Probably all the affections of the soul are associated with the body; anger, gentleness, fear, pity, sorrow, and joy, as well as loving and hating, for when they appear the body is also affected." Variations of this same thought have been repeated through the ages. However, it remained for Freud to supply the stimulus which evolved into the modern concept of psychosomatic medicine, and, from the point of view of scientific thought, the beginning of the psychodynamic approach must be credited to him and his theories that a great part of human behavior is determined by unconscious motivation. The traditional view that disease consisted of local damage caused by bacterial, mechanical, or chemical injury had to be changed because it could not apply to "diseases which develop as the result of the total reaction of the organism as a whole towards its environment. . . . The great majority of personality disorders belong to that category of disease in which the causal factors do not consist of local injury but have their origin in the repeated daily emotional influences to which a person is constantly exposed throughout the course of growing up."[1]

It took half a century and two world wars for these basic doctrines to develop into the modern psychosomatic approach. A tremendous impetus was received from World War II which "hastened the development of psycho-

somatic medicine because the severe stresses which it imposed on the fighting men brought into the clinical symptomatology of war neuroses thousands of emotionally induced physical disturbances."[2]

Modern medicine, having arrived at the understanding between the psychic and the somatic, is also arriving at a knowledge of the nature of this connection, which allows emotional states to alter the physiology of the body sufficiently to cause pathologic changes. We all experience emotions, and we all experience physiologic reactions to these emotions, such as commonly seen in blushing, laughing, and weeping. But these are the frank, evident expressions of emotions, and are not the harmful ones. They may be classified as conversion symptoms, which are the symbolic physical expressions of an emotion and relieve emotional tension and render it innocuous by transforming it into some form of expression through the voluntary, neuromuscular nervous system. In contrast with these physical expressions of emotion are their physiologic accompaniments. These consist of changes of vegetative function which occur as an integral part of the emotional state, and are normal reactions to the underlying emotions, just as elevation of the blood pressure is the normal cardiovascular response to rage. Injury is caused when there is a chronicity of these symptoms in response to a chronicity of emotional stimuli.

Anatomically, the hypothalamus in the diencephalon is considered to be that portion of the brain most concerned with the somatization of emotional states, although there is an interdependence and reciprocal action between the central and autonomic nervous systems at all levels. It is the hypothalamus which, in response to stimuli caused by emotional states, sends out efferent fibers which, directly or indirectly, affect the activity of the autonomic nervous system and integrate the activities of the viscera, enzymes, and smooth muscle.[3] When the emotional stimuli are strong enough, there is a continuity of physiologic alteration which may give rise to reversible or irreversible pathologic change.

Present-day medical literature is testimony to the frequency of the psychogenesis of physical complaints. Many psychic phenomena, previously thought to be a consequence of disease are now found to have a dynamic, causative relation to the disease,[4] and in many cases there is a distinct specificity, with specific emotional constellations evoking specific diseases. Among the diseases associated with emotional states are anorexia nervosa,[5] nervous vomiting,[4] peptic ulcers,[6] ulcerative colitis,[7] hypertension,[8] cardiac arrhythmias,[4] rheumatic disease,[9] urticaria,[10] neurodermatitis,[11] eczema,[4] psoriasis,[4] lichen planus,[4] bronchial asthma,[12] respiratory difficulties,[13] and allergies.[14] Since allergic children are so frequently seen in the orthodontist's office, it is relevant to note that in a recent study of such children it was stated that "psychological factors can precipitate, aggravate, or prolong the somatic symptoms of clinical allergy, and that by the same token they can prevent medical treatment from being effective."[15]

The application of the psychosomatic concept to dentistry has followed its medical counterpart. Pelzmann, after an investigation conducted by the psychosomatic medicine staff at Columbia-Presbyterian Medical Center in

New York City, found that "on the basis of available evidence, it is fair to say that in the oral cavity, the psychosomatic chain of events—emotional conflict, concomitant alteration of physiology, reversible pathological changes, irreversible pathological changes—takes place as frequently as in other parts of the body."[4]

Samuel Charles Miller defined psychosomatic dentistry as "the relationship of mental well-being to the health and integrity of the oral tissue," and he enumerated three aspects of it. There are: (1) those cases in which emotional tension causes oral disease through disturbed physiology, as by causing bruxism or changes in salivary composition; (2) those in which an oral deformity or dental fear causes an emotional disturbance; (3) intermediate case in which there are reciprocal relations between the two. The periodontal tissues, because of their vascularity, are especially vulnerable to psychosomatic factors, which may interfere with periodontal health by (1) reduction of local nutrition through vasospasm, (2) development of traumatic habits, (3) inducing excessive chewing, grinding, or clenching, (4) creating taste perversions which are locally or systemically harmful, (5) permitting insufficient food intake and utilization through limitation of gastrointestinal function, (6) neglect of oral sanitation, (7) causing systemic conditions inimical to periodontal health (e.g., alterations in the blood calcium and phosphorus levels).[16] Because periodontal health is of prime importance to tooth movement, these factors are equally applicable to orthodontics.

Psychosomatic considerations have been shown to play a role in other phases of dentistry. Psychic factors have been held responsible for toothaches, where emotional tensions have not been directed through normal channels.[17] Ziskin and Moulton,[18] in a study of glossodynia, reported that "psychic factors appeared to have an etiologic bearing in all instances." Occlusal neuroses, caries (through changes of salivary pH and composition, and faulty sanitation habits), and unsatisfactory denture experiences have also been attributed to psychosomatic factors.

It would seem from all this that psychosomatic considerations should have a bearing on the diagnosis, etiology, and treatment of some orthodontic cases. However, on the whole, the orthodontic profession has been slower to accept the psychosomatic concept than it has other pertinent medical concepts and their dental applications. Ryan[19] phrased a generality which may have some element of truth: "Some orthodontists are more concerned with the physical properties of an appliance than with the individual characteristics of the person and the tissue upon which the appliance is being used."

Certainly, an analysis of the general range and classification of patients requiring orthodontic treatment points to reasons why, as a group, they should be subject to emotional stresses in varying degrees. The orthodontist deals mainly with patients who have a sudden increase in the activities of the glands of internal secretion as they are reaching or have just reached adolescence, with its related social and sexual anxieties, problems of emancipation from parents, and struggles with religious and ethical concepts.[20] The orthodontist deals mainly with patients who have, as their major complaint, some degree of

conspicuous physical aberration, which must have associated emotional ramifications. The orthodontist must work in and around the oral cavity, which has a set of emotional factors all its own, ranging from its role in food-getting and security to the part it plays as an erogenous zone in sexual activity.

For these reasons, it would seem that in an orthodontic diagnosis it would be desirable to have an evaluation of the emotional make-up of the patient and possible psychosomatic influences which might be brought into play. But the present-day history and questioning charts and methods show little or no evidence of attempts to make such an evaluation. The orthodontist will ask at what age the patient had the mumps, but is not interested in the social development. He will inquire as to the birth weight, but fails to investigate characteristics of introversion or extroversion. If psychosomatic factors can have an etiological bearing and influence treatment of other medical and dental conditions, why do they not do likewise in orthodontics? The point to be made here is that they can influence orthodontic treatment, and the following cases are cited to show that they do.

CASE REPORTS

CASE 1.—The patient was a girl, 15 years of age. She was a very small girl, physically mature and pretty, but tiny, 4 feet, 10 inches tall. When she first presented at the office, she would not proceed into the operating room without her mother. She gave every evidence of social immaturity. Gradually, as she began to realize that pain was not a necessary concomitant of orthodontic treatment, and as a friendly attitude was developed between the orthodontist and herself, she allowed her mother to remain in the reception room during appointments. After four months of treatment, her mother no longer accompanied her to the office. During this period she graduated from grammer school and entered high school at the end of that summer.

Her original malocclusion was a mild Class II, Division 1 with rotated lower premolars; as part of the appliance therapy, all the lower teeth were banded with edgewise bracket bands, and an 0.020 stainless steel arch was inserted and ligated to the bands by means of stainless steel ligatures. Meanwhile, she had just reached her sixteenth birthday, and, at the end of nine months of treatment, it was becoming evident that she had formed an emotional attachment for the orthodontist. At this time she was being seen on the average of twice a month, but there developed a phase during which she would call at the office between appointments, complaining that the ligatures were scratching her cheeks and lips, producing painful lesions.

Examination of her mouth at these emergency appointments would reveal that these erosions were actually present, despite the fact that the ligatures had been carefully tucked under the arch and should have produced no trauma. On subsequent appointments, the ligatures were tied and placed out of the way of the cheeks and the lips with extreme care, but her calls for emergency appointments became periodic, and on each occasion she presented with traumatic mucosal erosions.

It was then hypothesized by the orthodontist that there was a psychogenic background for these lesions; that when she started at high school, she had been placed in a new social sphere, one of dating, and "crushes," and teen-age romance, and that in her social immaturity she had selected her orthodontist as the most readily available male recipient for her emotional attachments. To further this end, she wanted to see the orthodontist as frequently as possible, and if the appointments were spaced too widely, consciously or subconsciously, she would work her cheeks and lips so as to produce traumatic lesions.

To strengthen this hypothesis, appointments were given only nine days apart, and for one month there was no recurrence of the lesions. Then she was given an appointment for two weeks later, but at the end of the first week she called to say that the sores had returned and that she wanted to come to the office.

The orthodontist, realizing that a continuation of this situation might be emotionally harmful, and that it was certainly interfering with successful orthodontic treatment, attempted to adjust the situation by gradually working her appointments in at the same time as those of a handsome and personable boy who attended the same school and who came at three-week intervals. This plan worked, after a breaking-in period, during which it was made obvious to her that if she called for emergency appointments, her subsequent appointment would be changed so that it would not coincide with his. To the present time, at the end of twenty-one months of treatment, there has been no recurrence of the lesions for four months.

CASE 2.—The patient was a girl, 14 years of age. She was a physically well-developed and attractive girl, quiet and reserved, but apparently well oriented socially and emotionally.

She had been under treatment by an orthodontist in a neighboring city for nine months, but her parents felt that no progress was being made, and, after many discussions during which the orthodontist emphasized lack of patient cooperation, they separated by mutual consent, with the thought that perhaps it might be better for her to receive treatment within the suburb in which she lived.

She was referred to a local orthodontist, and oral examination revealed a Class II, Division 1 malocclusion, with appliances in the mouth. These consisted of a lower removable lingual arch and an upper twin-wire mechanism, and they were, in every sense, satisfactory. In preliminary conversations the girl stated that she did not like going to the neighboring city because she "wasted too much time," and that she did not like the first orthodontist "because he was too busy to talk to me." She insisted that she had followed his instructions and had been very cooperative.

With no change of appliance therapy and no repositioning of bands, treatment was satisfactorily completed in thirteen months.

CASE 3.—The patient was a young man, 19 years of age. Orthodontic treatment had been completed with excellent results at the age of 14 by a practitioner who had since died. The patient presented at the office of another ortho-

dontist and indicated that he felt that he required orthodontic treatment because the results of his first treatment had been unsatisfactory. Examination of his mouth revealed an excellent, stable result with the only discrepancy being a slight rotation of the upper right lateral incisor. He insisted that this was marring his appearance and preventing him from getting a good job. Actually, his teeth and mouth were his best physical features, and he was told that it would be ridiculous for him to receive orthodontic treatment.

Four months later he returned to the office with the same complaint, and then he returned two months thereafter. At this last visit it was observed that the lateral incisor appeared to be slightly more rotated.

The opinion of the orthodontist was that he was trying to throw the blame for his failure to secure a position on someone else's shoulders—in this case, the orthodontist's—and that there was a strong possibility that he had developed some sort of habit to make the rotation more pronounced and noticeable, thereby strengthening the excuse.

CONCLUSIONS

These are three cases in which emotional factors are in part influencing the course and outcome of orthodontic treatment, and there are many similar cases. In some instances, the connection between the underlying emotion and its effect upon occlusion are fairly evident, as in habit formation. Thumb- and finger-sucking are generally attributed to a child's need for security and affection. Nail-biting has been characterized by Rittenberg as "an evidence of a deep-seated disease of the personality. The somatic manifestations are found in the fingers and the mouth. . . . In every case of nail-biting it is possible to demonstrate a powerful thrust of instinctive desires having to do with infantile pleasures via the oral mucous membrane. And at the same time the repressing forces can be shown to be inadequate."[16]

Rittenberg classified bruxism as an expression of an aggressive group of instincts and stated that it may result when "the dynamic relationship of aggressive drives and repressing factors begin to show strain." He added that "in every case of bruxism there is a defect in the measures which the personality employs to inhibit aggresion."[16]

There are also those cases in which chronic emotional factors give rise to vegetative responses, and in which the relationship between these factors and orthodontic problems is more devious and obscure. In such cases, neurovascular responses set up through the autonomic nervous system have been demonstrated to be related to alterations in blood calcium and phosphorus levels, alterations in composition and pH of the saliva, changes in muscular tension, changes in acid-base balance and metabolism, changes in blood counts, and an altered state of physical health, such as in allergies and improper food utilizations.[4] Any and all of these may affect the tissues on which the orthodontist works and cause changes which are inimical to successful orthodontic treatment.

The orthodontist is in a peculiar position, psychosomatically speaking. He and the plastic surgeon have the opportunity to treat the psyche,

somatically; to remove emotional tension by improving facial appearance. At the same time, he is in the center of a vicious psychosomatic circle, in which the facial deformity may have set up emotional reactions which make correction of the deformity more difficult. Certainly, the orthodontist should be aware of these possible complicating factors and evaluate them before and during treatment. This is not meant to urge upon him the role of the psychiatrist or psychoanalyst, but rather for him to realize his responsibility for the recognition of psychosomatic symptoms, and the consultation with specialists in psychosomatic medicine where indicated. Such a course might well make subsequent orthodontic treatment simpler and more satisfactory.

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INVERTED, UNERUPTED SUPERNUMERARY TOOTH

Report of a Case

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SUPERNUMERARY teeth in the upper anterior region are so common that the possibility of this anomaly should always be considered when diagnosing any condition in this part of the mouth. Most of us have a rule, to which we try to adhere, of making roentgenograms routinely in *every* case. There are cases, however, particularly when we are going to work only on soft tissue, in which this self-imposed rule appears to be a waste of time. The case which will be reported here presents nothing spectacular or unusual in the way of surgical technique, but brings out very strongly the point that we would have run into grief without a preoperative roentgenogram.

CASE REPORT

History.—A boy, aged 9, was referred by his dentist on May 25, 1946, for dissection of the superior labial frenum, which apparently was causing a marked separation of the two upper central incisors.

Clinical Examination.—These teeth were at least 5 mm. apart, but otherwise in good position and alignment. The frenum was fairly large but not attached particularly low on the alveolar ridge. It did not blanch on the lingual surface when drawn outward, as most of them will do when the fibers extend through to the lingual surface. The remainder of the teeth in the mouth appeared to be in very good condition and the arches were well developed and apparently normal.

Roentgenographic Examination.—Intraoral roentgenograms revealed the presence of a supernumerary tooth squarely between the roots of the upper central incisors. The crown was apparently pointing straight up and the apex straight down. An occlusal projection was made to obtain a better orientation; it was seen that the apex of the supernumerary tooth root was pointing labially and was between the roots of the central incisors and the crown was pointing distally. The long axis of the tooth was apparently parallel with the occlusal plane of the upper teeth. (Fig. 1.)

Treatment.—The parents were told of the condition that existed and were advised that it would be necessary to remove the tooth before the central incisors could ever hope to come together. They consented to the operation and, in view of the patient's age and the position of the tooth, it was felt that a

general anesthetic was indicated. The patient was hospitalized and the operation performed June 1, 1946. He was given premedication of ¼ gr. codeine, hypodermically, and $\frac{1}{150}$ gr. atropine one hour before operation. Ether was the anesthetic used.

Operation.—An incision was made around the gingival margin of the teeth from one cuspid area to the other on the palatal side. The whole anterior part of the palate was turned back. The supernumerary tooth was not visible and some bone had to be removed to expose it. This had to be done with care to avoid injuring the structures in the anterior palatine canal and also to avoid loosening or dislodging the central incisors, which at his age would be a very easy thing to do. The tooth was found to be in exactly the position indicated by the occlusal roentgenogram and was elevated out palatally. It was not necessary to ligate any of the palatine vessels. The palatal flap was closed with black silk.

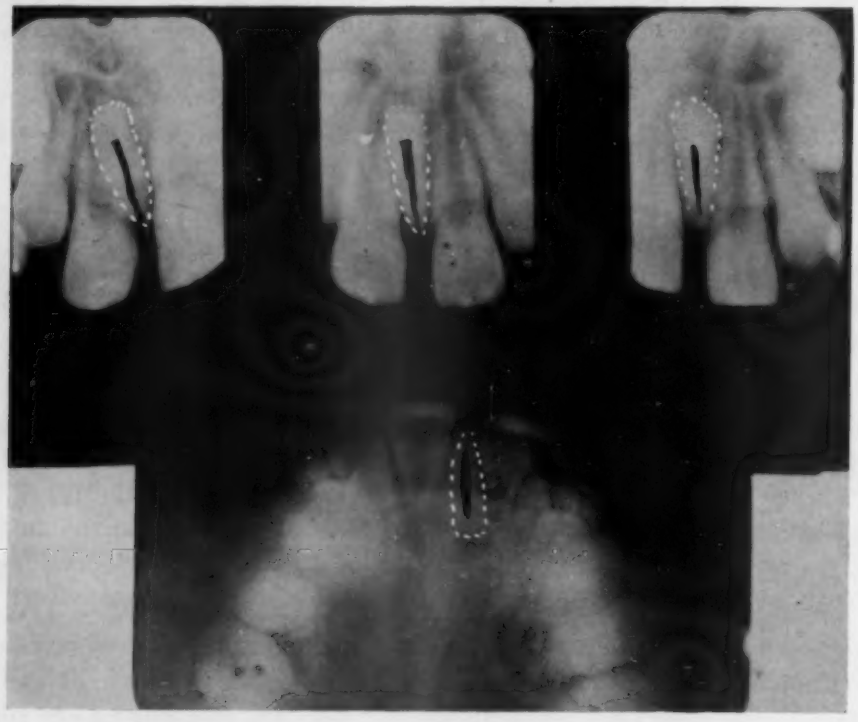

Fig. 1.—Unerupted supernumerary tooth between upper central incisors causing marked separation of these teeth. Occlusal projection (bottom) shows the apex of the root of the supernumerary tooth to be pointing labially and directly between the roots of the central incisors. This illustrates the great value of a good occlusal roentgenogram in any case of an impacted upper anterior tooth.

Course.—The postoperative course was rapid and uneventful. There was some swelling and soreness in the anterior part of the palate which lasted only a few days. The patient went home from the hospital on the day following operation and the sutures were removed at the office on the fifth day, at which time the wound was almost completely healed. The upper central incisors were somewhat loose for a few weeks, due to having lost some bone support on the lingual surface, but became very firm and tight again.

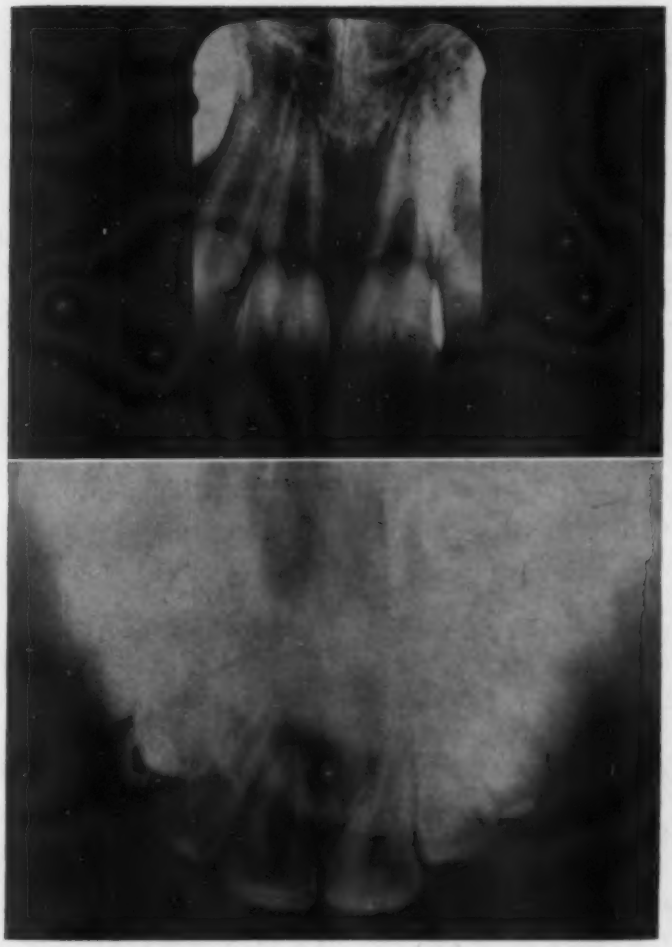

Fig. 2.—Roentgenogram made Aug. 20, 1947, fourteen months after removal of the supernumerary tooth. The space between the central incisors has almost completely closed and they are very firm. No orthodontic treatment was necessary.

The most gratifying part of the case is the way the upper central incisors came together without any orthodontic treatment. The roentgenograms shown in Fig. 2 were made Aug. 20, 1947.

Comment.—This patient might have had a frenum operation and then worn appliances for a number of years without any success if he had been treated without roentgenographic examination. It serves to emphasize further the well-known but frequently overlooked fact that we cannot do justice to the patient nor protect ourselves without it.

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PREPARATION OF THE CHILD'S MOUTH FOR ORTHODONTIC TREATMENT

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AN INCREASING number of children are being subjected to orthodontic corrective procedures. The preliminary preparation of the teeth and associated structures is often neglected, or they are poorly prepared to receive the necessary appliances. The dentist who refers the child may not be particularly interested in children or may not know what to do.

A child with a mixed denture will often have deciduous molars with cavities in them. Too frequently they are not restored to correct mesiodistal diameters. There may be an abscess or putrecent pulp present. There may be remains of root stumps and gingival inflammations.

These conditions must be corrected before orthodontic treatment is started. Good Bite-Wing x-rays must be taken to ascertain the condition of these deciduous teeth and the permanent first molars which are usually in place.

In the permanent first molars the pits and fissures may be involved. They should be carefully operated upon and filled. Either silver amalgam or gold in the form of inlays is the most frequently used material.

The most dangerous and therefore very important thing to look for is the condition of the mesial contact of the permanent first molar. Because of the shape of the embrasure the contact is usually involved. There may be a slight etching, a heavy decalcification, or a penetrated cavity of varying depth.

If the decidous second molar is still in place and will not be lost for a long period of time, a cavity can be prepared in the distal surface of the deciduous second molar large enough to provide direct access to the mesial surface of the permanent first molar.

A mesial surface cavity in the permanent first molar can be prepared and the cavity filled with silver amalgam. Otherwise, a large Class II cavity will have to be prepared with unnecessary loss of tooth structure. After this cavity is filled the cavity in the deciduous second molar is filled. The buccal pits on the mandibular molars are very dangerous and should be opened and filled. These buccal pits are often large and particularly in the mandibular second molars. The pits and fissures should be carefully examined and filled if open to any extent.

The large pits often found in the cingulum area of the maxillary lateral and central incisors should be very carefully cleaned out and filled. These pits vary in size, and depth, but are dangerous and should not be overlooked.

The types of restorations are indicated by the needs. Silver amalgam is perhaps most frequently used. In deciduous teeth we often use copper amalgam because of therapeutic effect on the surrounding tooth structure. The deciduous

pulp tolerates the near approximation of copper amalgam better than silver amalgam. Silver has no effect on bacteria while copper does, so perhaps that is the main reason for fewer dead pulps under copper amalgam than silver amalgam.

The permanent first molar may require a large restoration. If it is an MO or MOD use a gold inlay. Proper occlusion and strength can be secured.

Anterior teeth often have mesial and distal cavities, and because of the age of the child gold foil is contraindicated. Only silicates or cement can be used now, although the new acrylic quick-setting material shows great promise. If the pulp is still large, and it usually is, a good tooth-shade permanent cement can be used until the orthodontic work is completed, and then filling porcelains or other types of fillings can be used as a permanent restoration. We like the permanent cement because it protects the pulp better, and with a sedative zinc oxide base under it the pulp will recede and develop correctly.

Fractured anterior teeth are a special problem and the technique used has been outlined in other papers.[1] However, when a tooth is fractured and a band protector, either metal or plastic, is on it, the orthodontist in most cases can go ahead with his treatment leaving the final type of esthetic reconstruction until the orthodontic work is finished and the tooth is deemed in proper condition for the pin inlay, jacket crown, or whatever is indicated.

PREVENTIVE TREATMENT

We use immunizing solutions as a preventive measure regularly. Ammoniated silver nitrate is an old stand-by for molars and premolars as an interproximal immunizing agent. The tooth or teeth are walled off with cotton rolls and thoroughly dried. Then the silver solution is applied into the pits and fissures and interproximally. After a minute or two the eugenol solution is applied to precipitate the silver. The solution turns black and the excess should be blotted off and hot air applied to dry it on. It will cling only to spots that are actually etched. It should not be applied to anterior teeth because of its staining qualities.

Gottlieb impregnation solutions are used for the same purpose. Sodium fluoride is now being used very widely. The 2 per cent solution of sodium fluoride is used on an average of four times, about a week apart. In preparing a mouth for orthodontic appliances the fitting of bands and appliances can go on at the same time. The teeth should be thoroughly cleaned, the cotton rolls adjusted on one side, and the solution applied for at least five minutes and allowed to dry. Then the other side of the mouth should be treated.

We are of the opinion that this should be done by the orthodontist who is doing the work. Then he will be sure that a good job has been done. The weakness of all the solution treatments is that the solution does not always penetrate interproximally because of failure of capillary attraction to carry it in or perhaps the teeth have not been thoroughly dried.

The susceptibility of the individual has a great deal to do with one's results. It is very discouraging to do all these things and yet have cavities start. Who

is to blame does not stop the cavity formation. So a good, thorough preventive treatment is imperative.

There are gingival areas where food and detritus collect and the chalky etching begins to appear. The upper lateral incisors are a good example of this location. We have used sodium fluoride desensitizing paste with good results on these locations.

The formula is equal parts of sodium fluoride, kaolin, and glycerin in the form of a paste. Dry the area, apply the sodium fluoride pastes, and leave on for five or ten minutes. Do this several times. Each time use a small ball burnisher and burnish the surface. Since the paste is a strong poison it should be carefully wiped off and washed out of the mouth with water.

Since Kesel announced the advantages of ammoniated tooth powders there has been an increasing use by the public of this dentifrice. The evidence strongly recommends its use by the child, and it is certainly recommended for those who have appliances in their mouths.

The time is long past when the orthodontist can close his eyes to the need for preventive methods and care of the integrity of the tooth itself by regular applications of the solution of sodium fluoride or variations of silver nitrate solutions. We know from experience that these methods are very helpful and should be more widely known and applied.

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THE USE OF ISOTHERMAL PLASTICS IN ORTHODONTICS

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ISOTHERMAL or self-curing plastics which are available for use in dental prosthesis are adaptable for the fabrication of orthodontic appliances, such as all types of retainers, bite planes, bite-raising appliances, and mouth shields.

The technique for making appliances with isothermal plastic is simple and timesaving. The tedious steps of foiling, waxing the model, flasking, boiling out and curing the plastic are eliminated. An added advantage is the recovery of an intact model in most cases, which makes a new impression unnecessary when the retainer is lost or broken.

STEPS IN TECHNIQUE

1. The impression is poured in stone or plaster.

2. The model or cast is prepared as usual, that is, trimmed around gingival and any artefacts removed.

3. The wire portion of the retainer is constructed as usual. As the model is not tin-foiled, the wire to be embedded in the acrylic is adjusted so there is a slight clearance between it and the model surface.

4. The model is painted with water-glass in the area to be contacted by the acrylic. No dilution of the water-glass is necessary. If the model is dry, the water-glass will dry in about ten minutes.

5. When the water-glass has dried the acrylic is prepared, using a proportion of three parts of powder to one of liquid. About 12 c.c. of powder is mixed with 4 c.c. of liquid in a small glass dish or jar, using any suitable spatula—a cement spatula works well. It should be mixed only long enough to wet all the powder thoroughly, since it must be quite plastic for the next step.

6. A portion of this mix is immediately adapted to those areas of the model where the wire will be incorporated in the acrylic. The wire prepared in Step 3 is now placed on the model, making sure all the wire to be covered by the plastic has plastic between it and the model.

While stabilizing the wire with the left hand, the rest of the acrylic is immediately added to the palatal area of the model, completely covering the wires. The material is then shaped to the gingival and palatal areas with the fingers and thumb of the right hand. If the acrylic tends to stick to the fingers, they may be wet with the separating material (Lubra-coat), which is listed at the end of this article. With practice the proper thickness of acrylic is easily obtained. At this point a sharp knife is used to trim away excess acrylic around the gingival and posterior palatal regions.

7. The model is set aside for at least forty-five minutes, and then the retainer may be removed and polished. A satisfactory satin finish is obtained by polishing with laboratory pumice.

If a bite plane is to be added, it is done immediately after Step 6. A piece of excess acrylic is formed into shape for the plane. Both the surface of the plane and the area of the retainer which are to be in contact are painted with the acrylic monomer. The plane is then placed in position. The angles may be filled in with a new thin mix of powder and liquid if necessary.

For retainers and bite-raising appliances in which no wire is used, the acrylic is simply formed to the water-glassed model with the fingers.

For the making of mouth shields the plaster model is first coated with water glass. Then a glass slab, which is furnished by the company listed below, is coated with separating fluid and the acrylic is transferred to the slab immediately after mixing and allowed to stand for three minutes. The acrylic is then rolled out on the slab, transferred to the model, and trimmed around the periphery with scissors.

Materials used are: Coldpac Denture Acrylic (Motloid), Lubra-coat (Motloid), water glass, a four inch brayer or printer's roller.

163 MERRILL STREET.

Editorial

Can Orthodontic Service Be Expanded?

LATE in February a Senate House Economic Subcommittee charted a broad program, presumed to help safeguard the nation, and that reflects trends on the way.

Among other recommendations it proposed increased aid to dependent children under the social security program in all of the health services. It proposed a comprehensive program "which will permit all persons who desire to participate in a system of health insurance." The report said the program should be based on the voluntary cooperation of public and private agencies to bring better health service to childhood.

Now Senator Hunt of Wyoming (who is a dentist as well as a Senator) has come up with a new national health proposal. This brings out the fact that influence even from the professional groups is to come forward with a substitute for compulsory health insurance as heretofore proposed. The spearhead of dentistry's first move no doubt will be children's dentistry.

The basic difference between the Hunt plan and the administration's proposal is that public participation would be voluntary. The Hunt plan would put the government in health insurance with a prepaid program to cover medical and dental expenses, and this may very well be part of the solution of the problem.

In other respects, the plan would follow the recommendations of the Hoover commission, with the creation of a new Cabinet rank Department of Health. One thing, however, is certain: Any health service for childhood is to come in for careful study and scrutiny by the federal agencies as to its merit, and Senator Hunt made this clear in recent speeches.

The medical profession seems to look upon the Hunt plan with favor, and probably the most encouraging thing about this plan is that it reveals that substitutes can be found for the drastic program of socialized medicine backed by the administration.

This position is a sharp change from the former attitude of the American Medical Association when it concentrated its efforts merely to opposing the Truman plan. The Hunt plan is no doubt not the full answer; however, it can provide a starting point in working out a sound voluntary program which will insure better national health.

What about the orthodontic situation in the over-all health picture? Never before in all history was the velocity of change so fast from week to week and, obviously, orthodontics is no exception in the changing scene.

The venerable orthodontic mentor, Mr. E. H. Wuerpel, in a lecture befor the Oliver class at Washington University recently, discussed some matters of significance. He is quoted as having made a plea that orthodontics must quickly consolidate its position and get all of its courses and groups "under one tent." That suggestion no doubt was made for the same reason that Abraham Lincoln said, "United we stand, divided we fall."

Unorthodox practices advocating the extraction of children's teeth without subsequent treatment as a stopgap or compromise treatment are being given wide circulation in dental journals. Quite frequently I receive manuscripts which leave the impression that orthodontics is a house divided. Editors of independent dental journals reveal to me that they receive many unorthodox orthodontic manuscripts and do not accept them for publication. They advise that orthodontists should write more for the general practitioner or such literature will continue to be in demand.

Senator Hunt says all dental practice is to be studied by a federal agency.

Another bill S. 1411 (The National School Health Service Act of 1949) should be mentioned here. This measure promises prevention and treatment of the "physical and mental defects and conditions of all children between the ages of 5 and 17, inclusive, attending school."

The bill providing federal aid for medical schools (S. 1453) was passed by the Senate without formal opposition from the American Medical Association. In this respect it is similar to the bill providing federal grants for school health services (S. 1411).

It is no doubt time for orthodontists to give thought to two important problems that are tied in with the trend just mentioned:

1. How to extend orthodontic service to wider brackets of the people.
2. How to get the educational field closer together in order to consolidate its position as an applied science, as contrasted to an art or craft.

Not unlike the premise taken by Senator Hunt when he led out with a plan of health service as a substitute for the compulsory health service, so orthodontists should collectively advance their health service position and provide more service for more children.

You will no doubt answer that by saying, "O.K., but how am I going to do it?"

The problem seems to suggest that the answer might be, "Orthodontic practice may be simplified in practice and the first step in such a procedure is to try."

No doubt another very important and prudent step at this time would be to adopt the Wuerpel admonition and try to get orthodontic groups, particularly in an educational way, "all under one tent" and sponsored by the American Association of Orthodontists.

H. C. P.

Johnson Alumni Club

THE second meeting of the Johnson Alumni Club was held in the Brown Hotel, Louisville, Kentucky, on Jan. 23, 24, and 25, 1950. All day Sunday the trains, planes, and highways brought in the happy gathering from practically every state in the Union, as well as other countries. During Sunday evening Dr. and Mrs. Johnson gave a reception and cocktail party in their beautiful home, which had undergone special preparation for the occasion. The guests were transported in three groups by special buses which left the hotel in hourly relays. It only remained for the warm handshakes and the genial greetings of the gracious hosts to establish the spirit of welcome in this lovely setting which presaged the opening of what was destined to be a most profitable and successful session.

The meeting was formally called to order at 10 A.M. on Monday by Chairman Frank F. Lamons, of Atlanta, Georgia. The invocation was offered by the Reverend Doctor T. M. Giltner, Pastor of the Douglas Boulevard Christian Church. Addresses of welcome were delivered by Dr. Earl K. Hafner, President of the Louisville District Dental Society, Dr. John L. Walker, President of the Kentucky State Dental Association, and Dr. Robert P. Thomas, Trustee, American Dental Association, Sixth District. These addresses were filled with anecdotes of years of friendship and work with Joe Johnson, some dating back to roommate experiences of college days. The cordial response was made by Dr. Lowrie J. Porter, of New York City, on behalf of the members present. Dr. Johnson then delivered his opening lecture.

The Monday luncheon was served in the ballroom and was attended by 400 members, wives, and guests. Mrs. Johnson presided and entertained the gathering with some most interesting introductions and genial remarks. After the luncheon a fashion show presented a most colorful performance. A group of models paraded on an elevated walk which encompassed the entire room. They exhibited dresses, suits, jackets, coats, hats, and accessories suitable to most any occasion for milady.

The afternoon program was opened by four excellent case reports presented by Drs. Walter R. Bedell, of Poughkeepsie, New York, Ashley E. Howes, of New Rochelle, New York, Clare K. Madden, of Greenwich, Connecticut, and Joseph D. Eby, of New York City. Dr. Johnson concluded the afternoon with his second lecture.

In the evening twenty-two clinics opened in the Roof Garden at 8 P.M. and ran until midnight. They were presented by the following:

Andrew F. Jackson, Philadelphia, Pennsylvania
Frank O. Clifford, Kokomo, Indiana
J. G. Brittain, Harlingen, Texas
Martin J. Mayeau, Wheaton, Illinois
Faustin N. Weber, Memphis, Tennessee
J. William Adams, Indianapolis, Indiana
George H. Gowen, Toledo, Ohio

A. Wolfson, Newark, New Jersey
Walter J. Furie, Long Beach, California
S. J. Hecht, Red Bank, New Jersey
Edward W. Peaslee, Augusta, Maine
C. H. Vath, Cleveland, Ohio
John W. Richmond, Kansas City, Kansas
William A. Parker, Knoxville, Tennessee
Harry B. Wright, Philadelphia, Pennsylvania
Leigh C. Fairbank, Washington, D. C.
Alexis W. Eastwood, London, England
Joseph D. Eby, New York, New York
William A. Buhner, Daytona Beach, Florida
Harry L. Hosmer, Detroit, Michigan
R. G. Cooper, Portland, Oregon
R. Burke Coomer, Louisville, Kentucky

The Tuesday morning schedule opened at 9 A.M. with a lecture by Dr. Johnson which, after a recess at 10:15, was continued until noon. The Tuesday luncheon was served in the Crystal Ballroom and followed by a business session. The minutes of the previous meeting, held in Louisville Jan. 20, 21, and 22, 1947, were read by the Secretary-Treasurer Frank O. Clifford, and adopted. The Treasurer's Report was approved. The Nominating Committee recommended the following members to serve as the new Executive Committee, and they were unanimously elected:

Cecil G. Muller, Omaha, Nebraska
Neil J. Leonard, Memphis, Tennessee
Walter R. Bedell, Poughkeepsie, New York
Frank O. Clifford, Secretary-Treasurer, Kokomo, Indiana
Frank F. Lamons, Chairman, Atlanta, Georgia

Secretary Clifford announced the total official enrollment of 537 bona fide members, of whom 289 were present, with 125 accompanied by their wives.

At 2 P.M. four splendidly prepared case reports were presented by Drs. William F. Ford, Chicago, Illinois, George E. Morgan, Milwaukee, Wisconsin, Frank O. Clifford, Kokomo, Indiana, and M. Duke Edwards, Montgomery, Alabama. The rest of the afternoon was taken over by Dr. Johnson, who lectured from 3:00 to 4:30 P.M. At 6:30 P.M. a Social Hour was held in the South Room, the receiving line including Dr. and Mrs. Johnson, members of the Executive and Local Arrangements Committees and their wives.

At 8 P.M. the Crystal Ballroom was opened to the strains of music while the guests became seated. Following this an entertainer regaled the audience with songs from various states, sections, and countries. These were enthusiastically greeted by their various representatives, of whom approximately 450 were present. The orchestra continued to supply music during the dinner and for dancing later. The color of the floral decorations and the ladies' gowns served to provide a brilliant setting and a fitting background for the

spirit of informality and friendliness which prevailed. Dr. Frank F. Lamons officiated as toastmaster in his usual witty and efficient manner. The after-dinner entertainment was started with a humorous and most amusing address by Mr. B. M. Atkinson, of Louisville, author and columnist. Next on the program was a unique "broadcast" enacted perfectly with all the technique from the time a radio station goes on the air until it signs off.

This broadcast was participated in by some twenty-five members from the various states, and representatives from Canada, England, and South America. Each speaker was allowed a half minute in which to bring greetings and felicitations to Dr. and Mrs. Johnson. A recording was made to be presented to them later, and other copies were also to be available to the members. The appreciation of the Alumni Club was expressed in the form of an elaborate silver "Lazy Susan" service which was recieved by most gracious responses from both Dr. and Mrs. Johnson, who were deeply impressed. Dr. Lamons, as a member of the Supreme Council of the Psi Omega Fraternity, acting as their official representative, presented to Dr. Johnson an illuminated plaque from his fraters in recognition of his valuable contributions to the progress of orthodontics. Engraved silver water pitchers were presented to Drs. John A. Atkinson, Robert B. Coomer, Joseph L. Selden, and Wallace B. Standard in "sincere appreciation" for their assistance in the exceptionally fine local arrangements. This most enjoyable evening was concluded with dancing.

The Wednesday morning program was opened at 9:15 promptly with a case report by Dr. Lowrie J. Porter, of New York City. Dr. Johnson then gave his sixth and concluding lecture which he followed with an hour of answering written questions which had been requested by the members. This proved to be most interesting and instructive, a splendid finish to a fine program. Both Drs. Johnson and Lamons made suitable acknowledgment to those members who in every way had extended their efforts toward the success of the meeting. The old Executive Committee was thanked for their untiring services and the new committee installed.

It was evident by the attitudes of all the members that they had gained a great deal to take home and put to work, and with a parting good-fellowship the meeting was adjourned.

In Memoriam

WILLIAM GROSS SHEFFER

1892-1950

WILLIAM GROSS SHEFFER, one of the leading orthodontists of the Pacific Coast, died recently. Dr. Sheffer, or Will as he was familiarly known, was regarded highly in orthodontic circles all over America.

Dr. Sheffer was born in Colorado Springs, Colorado, in 1892 and attended the schools of that city, including the first year of college at Colorado College in Colorado Springs, 1914-1915.

He attended Williams College, Chicago, Illinois, 1915-1917, when he enlisted in World War I. Following the war he took one year in radiography at the University of California and worked in the radiography laboratory at St. Luke's Hospital, San Francisco. Upon entering the University of California, School of Dentistry, he took classwork and laboratory work on both campuses, receiving his D.D.S. degree from the University Dental School in 1923.

He immediately started practice in general dentistry and orthodontics in San Francisco, California, where he maintained his office until 1928.

He practiced orthodontics exclusively in San Francisco and San Jose, California, beginning in 1927, continued orthodontics one year in San Francisco, and later devoted full time to it in the San Jose office.

He was a member of the American Dental Association, California State Dental Association, and the Santa Clara District Dental Society, serving as its president in 1933.

He was elected Fellow of the American College of Dentists in 1935 and initiated in San Francisco during the meeting of the American Dental Association in July, 1936.

He was elected Fellow of the International College of Dentists in 1936. He was instructor in "Methods and Principles of Orthodontics" and "Essential Elements of Orthodontic History" to the sophomore class, junior class, curriculum I and II students, and graduate students at the University of California, School of Dentistry, from 1933 to 1936. Also he taught "Fundamentals of Orthodontics" and "History of Orthodontics," to freshmen dental students and hygienists in the fall of 1936.

Dr. Sheffer was a member of the Phi Delta Theta, Epsilon Alpha Honor Society, University of California (1920). He was a member and past-president of the San Jose Rotary and chairman of the Central Section of the Pacific Coast Society of Orthodontists from 1932 to 1933. He was general chairman of the California State Dental Association's annual meeting in San Jose in 1937, and general chairman of the meeting of the Pacific Coast Society of Orthodontists,

San Francisco, February, 1937. He was president of the Pacific Coast Society of Orthodontists from 1939-1941, president-elect of the California State Dental Association in 1949, and vice-president of the American Association of Orthodontists in 1946.

He was a member of the Edward H. Angle Society of Orthodontists, Northern California component, and also a member and past-president of the San Jose Camera Club.

Dr. Sheffer presented the following:

Gnathostatics, A Method of Investigation. Paper, lantern slides, and movies, presented to Santa Clara County Medical Society, 1929, and to Santa Clara Dental Society.

A Simple Case of Malocclusion. A pioneer movie on orthodontics presented to above societies, movies to Pacific Coast Dental Conference, San Francisco, 1929.

Photography, an Aid to Orthodontics. Paper given at Tenth Annual National Meeting, Edward H. Angle Society of Orthodontists, at Del Monte, California, April, 1936. Published in *Angle Orthodontist*, October, 1936.

Anthropometric Measurements. Paper presented to premedical and dental students, San Jose State College, Fall, 1936.

Orthodontics in Santa Clara County Under Crippled Children's Act. Presented at the Seventeenth Meeting of the Pacific Coast Society of Orthodontists, Feb. 23, 1937, San Francisco. Published in the INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY, October, 1937.

Diagnostic Treatment and Records. Read before the Southern Section, Pacific Coast Society of Orthodontists, Los Angeles, May 24, 1945. Published in the AMERICAN JOURNAL OF ORTHODONTICS, November, 1945.

Thus it may be seen that Dr. Sheffer was one of the most outstanding figures in orthodontics on the Pacific Coast and in the dental profession in general in the State of California, as well as an active citizen in the community and civic affairs in his home locality of San Jose.

His unlimited capacity and dynamic personality brought him leadership in any endeavor in which he was engaged, and his warmth and geniality among men brought him immediate popularity.

His keen and energetic interest in the affairs of the American Association of Orthodontists was an inspiring and vital force in its progress and development.

To those who enjoyed his close friendship, a close friend, indeed, has been lost, and his absence will be keenly felt by all.

Dr. Sheffer is survived by his wife, Mrs. Natalie Gray Sheffer, two daughters, Mrs. Charles A. Wallin and Mrs. Richard H. Day, and three grandchildren.

Department of Orthodontic Abstracts and Reviews

Edited by
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Oral Anatomy: By Harry Sicher, M.D., Professor of Anatomy and Histology, Loyola University School of Dentistry and Chicago College of Dental Surgery. St. Louis, The C. V. Mosby Company, 1949. With 310 text illustrations including 24 in color. 529 pages. Price, $15.

The present volume is based on the German text written by Sicher in collaboration with Julius Tandler. As such, it presents nothing new for those conversant with the aforementioned work.

However, for those who are not familiar with the former, this volume affords an excellent opportunity to become acquainted with the clear-cut descriptions and outstanding illustrations for which Sicher and Tandler are known. Since this volume is intended to supplement texts on dental anatomy, Sicher could well have included more references to original sources mentioned.

Anatomy today is no longer the study of dead soft tissues and bones, but is largely approached from the physiologic standpoint as functional anatomy. It may well be that newer advances in roentgenographic technique and the use of fluoroscopic motion pictures will render present anatomy books inadequate. Until that time comes students and practitioners will continue to rely on textbooks. Since this work is largely on descriptive anatomy, it is perhaps as well that the illustrations are confined to drawings of specimens and do not depend on halftone photographs. About 100 pages of the book are devoted to regional and applied anatomy. The book has an extensive index which makes it valuable as a work of reference.

Growth Failure in School Children as Associated With Vitamin B_{12} Deficiency —Response to Oral Therapy: By Norman C. Wetzel, Warren C. Fargo, Isabel H. Smith, and Josephine Helikson, *Science* **110**: 651-653, Dec. 16, 1949.

"Despite its original property as a growth-promoting agent for certain bacteria and subsequent evidence that it stimulates animal growth, studies of vitamin B_{12} in man have been confined to its hematopoietic, clinical, and neurological effects in disease—viz., pernicious anemia and sprue. Information on its more general nutritional value has thus far had to come from animal work, in which growth could be experimentally held in check as desired, through purified diets, and thus through deprivation of B_{12} or of other food constituents, with or without caloric restriction.

". . . any one of a number of nonspecific agents, even mere environmental change, can set recovery from growth failure in motion. What this means is that a growth stimulus attributable to vitamin B_{12} must be demonstrated in the face of whatever recovery had already set in, and hence by potentiation of such prior effects, which had themselves, moreover, been sufficiently stable to be taking place under a condition of statistical control. Technically, the problem is one of "improving an improvement" and of measuring both.

"As a rule, recovery from and treatment of simple growth failure in school children, whether mild, moderate, or severe as regards physique loss, level lag, or calorie debt, is readily achieved through systematic programming designed to meet individual needs. Some of the prominent elements of such programs are good hygiene, balance between exercise and rest, planned calorie conservation, and emotional calm, all aimed at restoring physique to par, and eliminating lag and fuel debts. The affliction is peculiarly amenable to group or institutional management when individual personality problems can be worked out. Obviously, diets must supply all daily needs including overages to cover fuel debts; composition approximates carbohydrates 50 per cent, fats 35 per cent, and proteins 15 per cent. On occasion, vitamin supplements are required. Nutrition is clearly to be emphasized because it is always involved in recovery, regardless of the main or inciting cause or causes that led to growth failure.

"In August, 1949, they began to administer 10 μg of crystalline vitamin B_{12} orally to 11 children (6 boys, 5 girls; ages 5-12 years) 3 of whom were selected on account of slow progress, the remaining 8 at random from a group of 76 under regular care for varying degrees of malnutrition and in varying states of recovery from simple growth remeasured weekly at the same hour. All other program elements were strictly maintained as before on an individual basis. A child, for example, who had been getting extra rest, or another who had been receiving whole liver extract, continued to do so.

"Five of the original 11 subjects responded dramatically to this single change in routine represented by the administration of B_{12}, the effects being objectively measured by physique and level gains as charted on each child's Grid record and, for utmost accuracy as calculated from the corresponding equations for physique and level of development. Before and after values of regression coefficients, standard errors thereof, and confidence bands for values of $p = 0.01$ and 0.001 were likewise computed, with due allowance for degrees of freedom available from the number of previous observations. Untreated resident children were a time-place-season control group.

"Clinical examinations prior to B_{12} ingestion revealed no characteristic or even suggestive regional signs in hair, skin, eyes, mouth, or nervous system. The only noticeable clinical changes after B_{12} administration were those of increased physical vigor, alertness, better general behavior, but, above all, a definite increase in appetite, manifested by demands for "second helpings," as contrasted with comparatively indolent food habits before. Moderate eosinophilia (6-8 per cent) and reticulocytosis (0.6-0.9 per cent) were found in 9 of the 11 subjects.

"The most dramatic general effects were shown by a boy with severe allergic bronchitis ,whose sleep for twelve months before had been regularly interrupted by asthmatic attacks and whose daytime wheezing permitted little desire for food, not to mention time for eating it. His growth response was accompanied by a remarkable attenuation of symptoms; in fact, these simply vanished during the first week, to the surprise of every attendant, lay or professional. What possible connections there may be between B_{12}, its influence on protein metabolism, and allergic disturbance, are questions for further investigation.

"Taken together, the foregoing results speak, and they speak with measurable statistical certainty, of what may be termed B_{12} functional deficiency, that was definitely benefited by oral therapy. As a final measure of effects it may be remarked that the growth responses were equivalent to another 100-240 days of regular institutional care without the help of B_{12}."

Medical Etymology—The History and Derivation of Medical Terms for Students of Medicine, Dentistry, and Nursing: By O. H. Perry Pepper, M.D., Professor of Medicine, University of Pennsylvania. Philadelphia and London, W. B. Saunders Company, 1949. 263 pages. Price, $5.50.

Dentistry and medicine employ terms of expression largely unknown to laymen. While most of the advancement in dental and medical science has taken place within comparatively recent years, the tendency still prevails to attribute Latin and Greek names or at least such prefixes and suffixes to new discoveries, compounds, and compositions.

Since the study of Laitn and Greek is almost at the vanishing point as an undergraduate subject, this book will be found highly useful not only in learning the origin and derivation of the various terms, but it will also help in the understanding as to why the term was applied in the first place. This book is not a dictionary but is concerned mainly with the origin and derivation of words. In addition, the book has cultural value in that it presents an outline of the etymologic development of current general dental and medical terms.

This volume makes interesting reading. The alterations which took place in Latin terms which themselves had largely been brought to Rome by the Greek slaves are shown. The growth of Latin into French and the change which took place in medical terms is pointed out. The changes of Latin words into English are discussed.

The subject matter has been separated into preclinical subjects, clinical subjects, and a special section on dentistry. The author points out that although Hippocrates mentions the crowding and irregularities of teeth and Celsus writes of treatment, the terminology of modern dentistry is of comparatively recent adoption.

As an example of some interesting terms described, we quote the following:

> bolus. Gr. *bolos* = a throwing or a catch. In Latin it became *bolus* = a morsel, and it came into English in 1603. It came in medicine to mean a large pill, but more recently the word is applied to a "swallow" of masticated food.

The book has a detailed index.

J. A. S.

Surgery of the Mouth and Jaws: By Julious Roy Bourgoyne, B.S., D.D.S., Diplomate of American Board of Oral Surgery; Member of American Society of Oral Surgeons; Chief of Oral Medicine and Surgery Staff, John Gaston City-County Hospital; Associate Professor in Charge of Oral Surgery and Anesthesia, University of Tennessee College of Dentistry, Memphis, Tennessee. Brooklyn, New York, Dental Items of Interest Publishing Company; Great Britain, Henry Kimpton's Medical Publishing House, 1949. 564 illustrations. Price, $12.00.

In the introduction to the book, Dr. James R. Cameron states that its purpose is "to present to the student and practicing dentist within reasonable compass, the author's experience in the field of Oral Surgery as a specialty of dental practice." How well this was accomplished Dr. Cameron does not state, although he does say that the book should be "eminently satisfying reading to those interested in the subject."

Part I of the book includes chapters on examination of the oral cavity and roentgenographic technique. Also discussed are diet, emergency treatment, and chemotherapy.

Part II includes minor operations such as apicoectomy, removal of root tips, and surgical treatment of "pyorrhea." The book contains 564 illustrations many of which could easily have been omitted and the quality of most of the rest of them could have been improved.

In the chapter on apicoectomy, the author presents a list of indications and contraindications. The operation is described in a step-by-step procedure. A detailed description is given on the removal of the frenum labium.

This reviewer has found frenum operations of questionable value, except, as stated by Dr. Bourgoyne, to allow better fit for a denture, and altogether unnecessary in the child who can be treated by orthodontic means. The reviewer finds that approximation of the central incisors for orthodontic means and retention of these teeth in an approximated position until the permanent dentition is erupted is the most adequate method for eliminating diastemas of the central incisors. Frequently, excision of the frenum leads to undue curling of the upper lip, formation of scar tissue, and recurrence of the diastema.

The book has a detailed index and should be useful as a work of reference.

Oral Histology and Embryology: Edited by Balint Orban, University of Illinois, College of Dentistry, Chicago, Illinois. Second edition. St. Louis, The C. V. Mosby Company, 1949. With 265 text illustrations including 4 color plates. Price, $8.00.

Contributors to the second edition include such well-known dental histologists as Aisenberg, University of Maryland; Bevelander, New York University; Boyle, University of Pennsylvania; Cheyne, University of Washington; Diamond, Columbia University; Kerr, University of Michigan; Kitchin, Ohio State University; Nuckolls, University of California; Orban, University of Illinois; Robinson, Ohio State University; Schour, University of Illinois; Sicher, Loyola University; Skillen, Northwestern University; Thomas, University of Washington; Weinmann, University of Illinois; Worman, University of Minnesota, and Zander, Tufts College.

In the present edition, published five years since the appearance of the first, the material has been integrated into a more logical sequence. Chapter I presents the development of the face and the oral cavity. The illustrations of histologic preparations are reproduced in an excellent manner. Under "Development and Growth of the Teeth," an account is presented of the various stages of dental development and each is illustrated.

Enamel, dentin, cementum, the pulp, and periodontal membrane are each discussed in separate chapters. A valuable chapter of special interest to the practicing dentist and orthodontist is one on the shedding of the deciduous teeth by Myron S. Aisenberg. An interesting point regarding the loss of deciduous teeth is made when it is pointed out that traumatic lesions may at times lead to ankylosis of a deciduous tooth rather than its loss. With regard to retained deciduous teeth, Aisenberg points out that while such teeth may remain in function for many years, resorption of the roots and continued active and passive eruption cause their loosening and final loss. Since the deciduous teeth are not a swell adapted to the stresses of mastication as the larger permanent teeth, their loss is usually due to traumatism.

The persistence of pulpal tissue and its organic connection with the underlying connective tissue are given as reasons why deciduous teeth may show a fairly strong attachment even after total loss of their roots. In such cases, the erupting permanent tooth may actually come into contact with the deciduous tooth. The masticatory forces are then transmitted to the permanent tooth before its suspensory ligament is fully differentiated and traumatic injuries in the periodontal membrane of the permanent tooth may develop.

A chapter on technique preparation of histologic specimens and a full index are appended.

J. A. S.

Conduction, Infiltration and General Anesthesia in Dentistry: By Mendel Nevin, D.D.S., Former Oral Surgeon, Greenpoint Hospital; Former Oral Surgeon, Hospital Deformities and Joint Diseases; Consultant Anesthetist, Ocean Hill Memorial Hospital; Ex-President, Kings County Dental Society; and P. G. Puterbaugh, M.D., D.D.S., Professor of Principles of Medicine and Anesthetics and Associate Professor of Oral Surgery, Chicago College of Dental Surgery; Ex-President and Life Member of the Illinois State Dental Society; President of the Odontological Society of Chicago; President-Elect of the Odontographic Society of Chicago; Honorary Member of the Milwaukee Dental Forum. Revised fifth edition. Illustrated with 228 engravings and large trigeminal nerve chart. Brooklyn, New York, Dental Items of Interest Publishing Company; Great Britain, Henry Kimpton's Medical Publishing House, 1948. Fifteenth printing. Price, $7.50.

This volume originally published over a quarter of a century ago and now in its fifth edition has been thoroughly revised. The book is well known and has been widely used as a standard work on the subject.

While the technique described in the fourth edition is essentially the same, the authors have added material on the use of the anitbiotics in connection with local anesthesia. The last 50 pages of the book are devoted to general anesthesia and analgesia. The method is described for the injection of penicillin in connection with local anesthetics for dental operations. Indications are given for the use of Monocaine-penicillin-epinephrine solution in dentistry. The prophylactic use of penicillin is described.

With the more widespread use of analgesia in operative dentistry have come a number of misconceptions with regard to the drugs to be used and the method of their use. Dr. Puterbaugh has contributed the section on general anesthesia and analgesia. According to him, while local anesthesia is satisfactory for alleviating pain incident to routine dental practice, general anesthesia is a most valuable aid in rendering painless certain surgical operations as well as in avoiding psychic shock in others, where local anesthesia is contraindicated. The preparation of the patient for the administration of general anesthesia is given. The book is well illustrated and has a detailed index.

News and Notes

American Association of Orthodontists

The 1950 meeting of the American Association of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, Illinois, May 8, 9, 10, and 11.

American Board of Orthodontics

The 1950 meeting of the American Board of Orthodontics will be held at the Edgewater Beach Hotel, Chicago, Illinois, May 4, 5, 6, and 7. Orthodontists who may desire to be certified by the Board may obtain application blanks from the Secretary, Dr. Stephen C. Hopkins, 1726 Eye Street, N. W., Washington 6, D. C. Applications must be completed not later than March 1, 1950, for consideration at the Chicago meeting.

Research Section Meeting of the American Association of Orthodontists

In accordance with the policy of recent years, time will be set aside for research reports at the coming meeting of the American Association of Orthodontists. Any individual desiring to report on a current research problem, completed or in progress, may do so by communicating with Dr. J. A. Salzmann, 654 Madison Avenue, New York, New York.

Each application should be accompanied by the author's name, address, and institution with which he works, if any. An abstract of not more than three hundred words should be forwarded at the same time.

Presentation time will be limited to fifteen minutes.

ALLAN G. BRODIE, Chairman.

Central Section of the American Association of Orthodontists

The 1950 meeting of the Central Section of the American Association of Orthodontists will be held at Cedar Rapids, Iowa, September 10, 11, and 12.

Southern Society of Orthodontists

The twenty-sixth annual meeting of the Southern Society of Orthodontists will be held at the Sherry Frontenac Hotel, Greater Miami, Florida, Nov. 15, 16, and 17, 1950. Extensive plans and preparations are being made for this meeting. It will be held under the direction of President E. C. Lunsford, of Miami.

FRANK P. BOWYER, Secretary.

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists held its twenty-ninth annual session in the beautiful Shamrock Hotel, in Houston, Texas, on Feb. 12 to 15, 1950.

A number of excellent case reports and a full half day of interesting table clinics were presented at the meeting. A well-balanced program was presented by the following: Dr. F. C. Elliott, Dean of Orthodontics at the University of Texas; Dr. W. B. Downs, Professor of Orthodontics at the University of Illinois; Dr. S. J. Kloehn, of Appleton, Wisconsin; M. E. Trutt, of Houston, Texas.

Early publication of this material in our official journal, the AMERICAN JOURNAL OF ORTHODONTICS, will be both interesting and informative to the profession.

Entertainment was provided by the efficient efforts of the local committees, and with the super convention facilities of the hotel. Some slight competition was offered by the Marx Brothers, Sinatra, and Roy Rogers, who appeared on the current hotel entertainment.

Inclement weather hindered the Sunday golf tournament; however, the attendance at the evening nineteenth hole stag party was 100 per cent. Here the numerous golf prizes were awarded. Drs. Joe Peak and Cary Middlecoff, of the Society, carried off the championship prizes. This has become a habit with Joe for the past few years.

The registration indicated that over 90 per cent of the members were present, and with the ladies, invited guests, and exhibitors the total attendance exceeded one hundred. Eleven new members were admitted.

Dr. Nathan Gaston, of Monroe, Louisiana, was installed as the new president. Dr. Marion Flesher, of Oklahoma City, was elected to serve another year as secretary-treasurer. The city of Monroe, Louisiana, was selected as the meeting place for 1951.

The program was dedicated to the late Dr. Mark Perrin, who, as a member for many years, had efficiently served the society and his profession. His genial personality and sincere friendship endeared him to the entire membership. His absence will continue to be felt as we meet in the future years.

Denver Summer Seminar

The Thirteenth Denver Summer Seminar will be held this year at the Park Lane Hotel, Denver, Colorado, July 30 through Aug. 4, 1950. The following is a partial list of the clinicians who will appear on the program. A complete list will be published at a later date.

Dr. Wendell L. Wylie, Director of Postgraduate Dental Education at the School of Dentistry, University of Washington, will lecture on "The Role of Inheritance in Malocclusion."

Dr. Edward A. Cheney, Lansing, Michigan, will provide three discussions on "Individual Case Analysis Relative to Extraction," "Occlusion and Wind Instrument Embouchure," and "Preventive and Palliative Orthodontics."

Dr. Brooks Bell, Dallas, Texas, will present a paper on "Economics," covering: I. The Physical Setup and Operation of an Office; II. Office Paper Work; III. Psychology in the Orthodontic Office.

C. Richard Horwedel, Ph.D., M.E., Chief Metallurgist, American Steel and Wire Company, will lecture on "The Metallurgy of Stainless Steel."

Italian Convention on Stomatology

The twenty-fifth annual Italian Convention on Stomatology promoted by the A.M.D.I. (Italian Medico-Dental Association), affiliated society to the F.D.I., will be held from Sept. 26 to 30, 1950, at Stresa (Lake Maggiore).

Survey of Dental Practice

The American Dental Association announces that a comprehensive survey of dental practice will be conducted during April by the Bureau of Economic Research and Statistics of the American Dental Association.

A detailed questionnaire will be sent to one-fourth of the dentists in the United States—including members as well as nonmembers of the A.D.A.—and all dentists who receive the questionnaire are urgently requested to cooperate in providing the requested information.

Purpose of the survey is to compile factual data regarding dental practice which can be used in the development of sound and practical dental health programs. Such data are needed particularly to counteract the great amount of misinformation and unsupported propaganda that have been advanced in current debates on schemes for the solution of the nation's dental health problems.

The information will be of considerable value to the profession, especially for those representatives of the profession who are engaged in conference with government and private agencies in planning dental health programs.

The lack of definitive information on dental practice in Great Britain placed the dental profession there at a serious disadvantage two years ago when it was engaged in negotiations with the British government regarding operation of the National Health Service Act.

The questionnaire, which will be in two parts, will be mailed to every fourth dentist on alphabetical lists. The first part will request general information about the practice of the individual dentist. The second will ask for specific information on the dentist's practice during the week of April 16 through April 22, and will deal with the number of patients treated, the actual number of hours spent in chairside, laboratory, and office work, and the various treatments provided.

No signature or identification of the questionnaire will be required. The completed forms will be used only for the compilation of factual data about groups of dentists. No information will be released about any individual dentist.

It was emphasized that by cooperating in the survey, the individual dentist will be making a significant contribution not only to his profession but also for the continued protection of the public.

New Program of Dental Research Assistantships for Postgraduate Students of Chemistry

Establishment of a new program of dental research assistantships for postgraduate students of chemistry was announced jointly by the American College of Dentists and the American Dental Association.

The program will be carried out under the direction of the A.D.A. Bureau of Chemistry.

Graduate students selected for the assistantships will be paid a salary from funds made available through a special grant of $2,500 a year from the American College of Dentists and a similar sum allocated by the A.D.A.

Working space and equipment will be provided at the A.D.A. laboratories, 222 East Superior Street, Chicago.

All recent graduates in chemistry who ranked in the upper one-quarter of their class and who will be admitted to graduate study in chemistry at a recognized university in the Chicago area will be eligible to apply for a research assistantship, it was pointed out by Dr. J. Roy Doty, Director of the A.D.A. Bureau of Chemistry.

To qualify, students will also have to be recommended by the head of the chemistry department of their respective school.

Those accepting appointments will be required to work part time on special research projects. Included will be studies which will be useful in the development of specifications for dental therapeutic items and other projects in the field of dental science.

The program will get underway early this summer. Applications will be accepted from students who will receive their bachelor's degree this June, as well as from those who already are engaged in postgraduate study in the fields of chemistry.

Atomic Medicine Course Opens at Jefferson Medical College

The first organized course in the medical aspects of atomic energy was formally opened tonight at Jefferson Medical College, Philadelphia, Pennsylvania, in the presence of most of the faculty and student body of the college, and invited guests. Opening the course was a lecture on "The Problem of the Physician in an Atomic Disaster," by Colonel James P. Cooney, Army Medical Corps officer, who is chief of the Radiological Branch, Division of Military Application, Atomic Energy Commission, and consultant in radiology to Major General R. W. Bliss, Army Surgeon General.

Colonel Cooney delivered a message from Major General George E. Armstrong, Deputy Surgeon General, in which he hoped that other leading medical teaching institutions would follow Jefferson's lead by placing a similar course in their curricula, and pledging the "wholehearted cooperation" of the Army Medical Department.

The course, to be repeated annually, will consist of eighteen hours of instruction to students on the junior level, with fourteen hours to be given by the Departments of Radiology, Medicine, and Surgery of Jefferson Medical College. The other four hours will be given by Army experts in atomic medicine. These, in addition to Colonel Cooney, will be Lieutenant Colonel Larry Smith, Professor of Military Science and Tactics at Jefferson, and Major Gerald M. McDonnel, Chief of the Medical Branch, Radiological Defense Division, Armed Forces Special Weapons Project.

Tonight's lecturer, Colonel Cooney, drew his subject matter from an extensive experience with the medical aspects of atomic explosion. He was assigned to the Manhattan Engineering District early in 1946 for training in preparation for the Bikini bomb tests, and was the chief Army medical officer present during those tests. Later, following a special mission to Japan to study the survivors of the Hiroshima and Nagasaki explosions, he became medical director of the Manhattan District, and served as radiological safety officer during the Eniwetok tests.

Colonel Cooney's talk, profusely illustrated with slides, placed the students in the position of a group charged with planning the medical defense against a Hiroshima-type explosion. The casualties, he said, would be of three different kinds, resulting from blast, burns, and radiation. The direct blast effect of the Hiroshima bomb was "rather insignificant," Colonel Cooney reported, causing "about a hundred ruptured ear drums, and no cases of trauma to the lungs or ruptured viscera." The indirect effect, however, "was tremendous" and was manifested by flying debris, masonry, timbers, and glass fragments.

Although few serious injuries were found as a result of the blast, Colonel Cooney said, "We know that serious injuries did occur, but unfortunately no effort was made to evacuate the wounded, and those persons unable to walk out of the area were burned to death by fires. The failure to rescue thousands of wounded people in such a situation must not happen here," he insisted. "The public must be given the facts about the measures which can be taken to minimize casualties and suffering. We must not unduly frighten people to the extent that they will refuse to participate in rescue attempts."

Burn casualties, the Army expert said, will be divided between those caused by the flash and those resulting from flames. Beyond 1,000 yards, clothing "offered considerable protection against flash burns," Colonel Cooney said. Color and tightness of the clothes were factors; loose, light clothing provided more protection than tight, dark raiment. Also, individuals exposed to the flash will be temporarily blinded, he told the medical students.

The problem of caring for thousands of thermal or flame burn patients will be "a challenge to the ingenuity and resourcefulness of American medicine," the speaker warned, reminding his audience that the burns resulting from the Cocoanut Grove night club fire heavily taxed the medical facilities of Boston, "one of the leading medical centers of the world." Therefore, Colonel Cooney asserted, "It is essential that serious consideration be given to appropriate procedures for the mass treatment of thermal burns."

The third hazard, ionizing radiation, is the one which makes the atomic bomb distinctly different from a conventional bomb, the Army doctor said. "Let us not underestimate nor attempt to debunk the radiation hazard. The deaths from ionizing radiation at Hiroshima amounted to 9,000. However, the emphasis placed on it has confused and frightened people to the extent that many believe it will be dangerous to enter a bombed community and rescue the wounded. This is unfortunate and erroneous," Colonel Cooney insisted. "We cannot emphasize too strongly that the initial problem is the evacuation and treatment of the blast and burn casualties. After the detonation of an atomic bomb, such as at Hiroshima and Nagasaki, it is perfectly safe to enter the area and rescue the wounded without fear of exposure to residual radiation."

The Army radiologist concluded his talk with a technical medical analysis of the cases seen in Japan.

Notes of Interest

Dr. Doris M. Rhodes announces the opening of an office at Suite 3, 124 Mamaroneck Avenue, White Plains, New York, practice limited to orthodontics, telephone, White Plains 9-3221, Scarsdale 3-5998.

Sidney Schohan, D.M.D., announces the opening of his offices for the exclusive practice of orthodontics at 389 Union Avenue, Laconia, New Hampshire, Monday, Thursday, and Saturday, and at 15 North Main Street, Concord, New Hampshire, Tuesday and Friday, office hours, 9-12, and by appointment, telephones, Laconia 1314 and Concord 4495-K.

Louis Schwartz, D.D.S., announces the transfer of his office from 3229 Parsons Boulevard, Flushing, New York, to the Bank of the Manhattan Building, 39-15 Main Street, Flushing, New York, practice limited to orthodontics.

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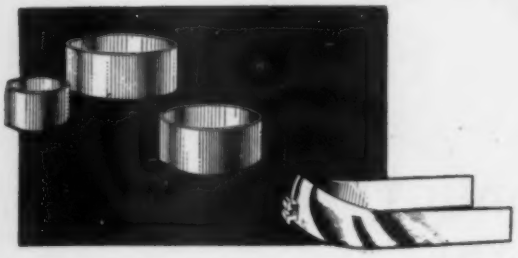

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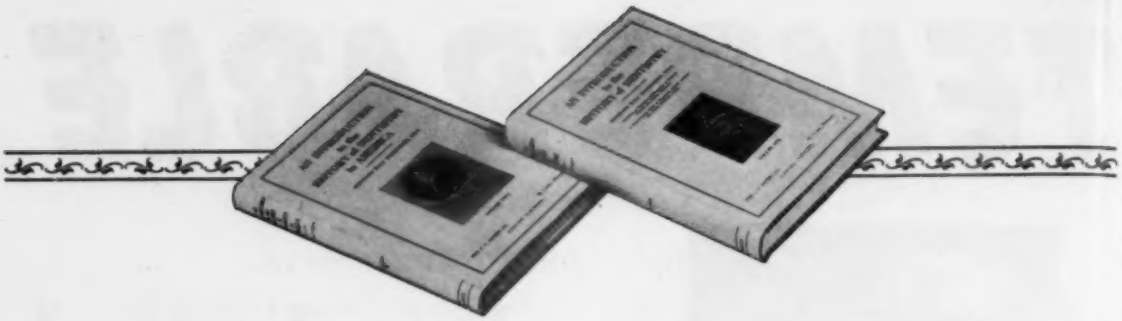

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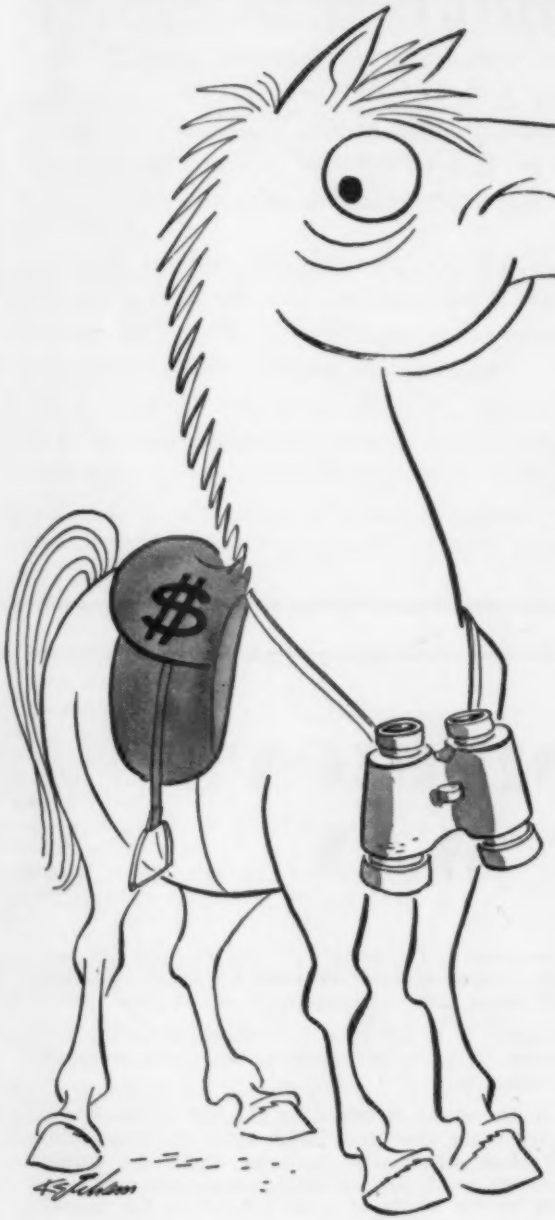

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"You say it pays four bucks for every three?" he asked.

"Yep," I replied.

"And can't lose? It *automatically* wins? Must be illegal!"

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"Our government approves of a horse who can't lose..."

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